# THE CLIPPER SHIPS

# THE CLIPPER SHIPS

WESTERLIES
NORTH AMERICA
UNITED STATES OF AMERICA
CALIFORNIA
San Francisco
FARALLON ISLANDS
Honolulu
Hawaii
NORTHEAST TRADES
WESTERLIES
GREAT BRITAIN
GULF STREAM
Salem
Boston
New York City
Sandy Hook
Baltimore
Chesapeake Bay
BERMUDA
New Orleans
WEST INDIES
NORTHEAST TRADES
PANAMA
DOLDRUMS
EQUATOR
ATLANTIC OCEAN
DOLDRUMS
Cape São Roque
SOUTH AMERICA
SOUTHEAST TRADES
CHINCHA ISLANDS
PERU CURRENT
BRAZIL CURRENT
Rio de Janeiro
ARGENTINA
PACIFIC OCEAN
Valparaiso
CHILE
Rio de la Plata
ROARING FORTIES
Strait of Le Maire
Staten Island
Cape San Diego
Cape Horn

ASIA
CHINA
Yokohama
JAPAN CURRENT
Shanghai
Foochow
Canton
Macao
Hong Kong
Formosa Strait
Whampoa
PARACEL ISLANDS
SOUTH CHINA SEA
PHILIPPINES
NORTHEAST TRADES
Port Said
Suez Canal
EGYPT
RED SEA
Calcutta
INDIA
BURMA
SIAM
MALAYA
Macclesfield Bank
Singapore
BORNEO
SUMATRA
JAVA SEA
Sunda Strait
JAVA
Java Head
Anyer Lor
DOLDRUMS
SOUTHEAST TRADES
INDIAN OCEAN
Mauritius
AUSTRALIA
Melbourne
Sydney
ROARING FORTIES
WESTERLIES
ANTARCTICA

*The Seafarers* THE CLIPPER SHIPS

TIME LIFE BOOKS

PEOPLES OF THE WILD
THE EPIC OF FLIGHT
THE SEAFARERS
WORLD WAR II
THE GOOD COOK
THE TIME-LIFE ENCYCLOPAEDIA OF GARDENING
HUMAN BEHAVIOUR
THE GREAT CITIES
THE ART OF SEWING
THE OLD WEST
THE WORLD'S WILD PLACES
THE EMERGENCE OF MAN
LIFE LIBRARY OF PHOTOGRAPHY
THIS FABULOUS CENTURY
TIME-LIFE LIBRARY OF ART
FOODS OF THE WORLD
GREAT AGES OF MAN
LIFE SCIENCE LIBRARY
LIFE NATURE LIBRARY
YOUNG READERS LIBRARY
LIFE WORLD LIBRARY
THE TIME-LIFE BOOK OF BOATING
TECHNIQUES OF PHOTOGRAPHY
LIFE AT WAR
LIFE GOES TO THE MOVIES
BEST OF LIFE

*The Cover:* En route to San Francisco during her maiden voyage, the clipper ship *Golden State* slashes across a stretch of the wintry Atlantic ahead of a rival clipper in this painting by Leslie A. Wilcox. The swift *Golden State* was launched in New York in 1853 and sailed the great trading routes of the world for 33 years.

*The Title Page:* Cast in 1869, this brass bell—measuring 13 inches both in height and in diameter—hung near the forecastle of the *Cutty Sark*, the queen of British clippers. The ship's lookout rang the bell to announce the time, warn of fog and tell when the crew was weighing anchor.

*The Seafarers*

# THE CLIPPER SHIPS

*by A. B. C. Whipple*
AND THE EDITORS OF TIME-LIFE BOOKS

TIME-LIFE BOOKS, AMSTERDAM

*The Seafarers*
*Editorial Staff for The Clipper Ships:*
*Editor:* Jim Hicks
*Designer:* Herbert H. Quarmby
*Chief Researcher:* W. Mark Hamilton
*Picture Editor:* Peggy L. Sawyer
*Text Editors:* Anne Horan, Stuart Gannes, Gus Hedberg, Sterling Seagrave
*Staff Writers:* Michael Blumenthal, Kathleen M. Burke, Kumait N. Jawdat, Lydia Preston, Teresa Pruden, David Thiemann
*Researchers:* Philip Brandt George, Sheila M. Green, Ann Dusel Kuhns, Trudy W. Pearson, Jeremy Ross, James R. Stengel
*Art Assistant:* Michelle René Clay
*Editorial Assistant:* Ellen P. Keir

Special Contributor
Barbara Hicks (Research)

Correspondents: Elisabeth Kraemer (Bonn); Margot Hapgood, Dorothy Bacon, Lesley Coleman (London); Susan Jonas, Lucy T. Voulgaris (New York); Maria Vincenza Aloisi, Josephine du Brusle (Paris); Ann Natanson (Rome).
Valuable assistance was also provided by: Enid Farmer (Boston); Diane Asselin (Los Angeles); John Dunn (Melbourne); Carolyn T. Chubet, Miriam Hsia (New York); Mimi Murphy (Rome); Janet Zich (San Francisco); Peter Allen (Sydney); Nancy Friedman (Washington, D.C.).

© 1980 Time-Life Books Inc. All rights reserved.
Second European English language printing 1982.

No part of this book may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval devices or systems, without prior written permission from the publisher, except that brief passages may be quoted for review.

ISBN 7054 0631 8

TIME-LIFE is a trademark of Time Incorporated U.S.A.

*The Author:*
A.B.C. Whipple, a former Assistant Managing Editor of Time-Life Books, is an avid sailor and student of maritime history. He has written 10 books about ships and the sea, including *The Whalers* and *Fighting Sail* in The Seafarers series and a general history, *Tall Ships and Great Captains.*

*The Consultants:*
John Horace Parry, Gardiner Professor of Oceanic History and Affairs at Harvard University, is a renowned maritime historian. After he received his Ph.D. at Cambridge University, he fought in World War II, rising to the rank of commander in the Royal Navy. He has published many historical studies such as *The Discovery of the Sea, Trade and Dominion* and *Europe and a Wider World.*

Philip Chadwick Foster Smith, the author of eight nautical books, is curator of the Philadelphia Maritime Museum. Previously, he was in charge of the maritime collection at the Peabody Museum in Salem, Massachusetts, and served as managing editor of *The American Neptune,* a journal devoted to nautical history.

William Avery Baker was formerly curator of the Hart Nautical Museum at the Massachusetts Institute of Technology, where he earned his degree. A naval architect and engineer, he has drawn the reconstruction plans for 22 historic sailing vessels during the course of his career.

David R. MacGregor, who was educated at Cambridge University, is a noted author, draftsman and marine artist. His paintings have been exhibited in London and his carefully researched ship plans are sold around the world. Among his books are *The Tea Clippers* and *Fast Sailing Ships.*

# Contents


*Essay* Ships to stir the seafaring heart 6

Chapter 1 **The zenith of the age of sail** 16

Chapter 2 **A golden lure for clipper builders** 46

*Essay* From mold loft to launch: genesis of a Yankee clipper 72

Chapter 3 **Behind the romance, a bitter test of wills** 80

Chapter 4 **Every sea a racecourse, every voyage a trial of speed** 102

*Essay* A passenger's view of a "most pleasant voyage" 124

Chapter 5 **"A grand ship that will last forever"** 130

*Essay* Down-easters: a last echo of a vanishing tradition 164

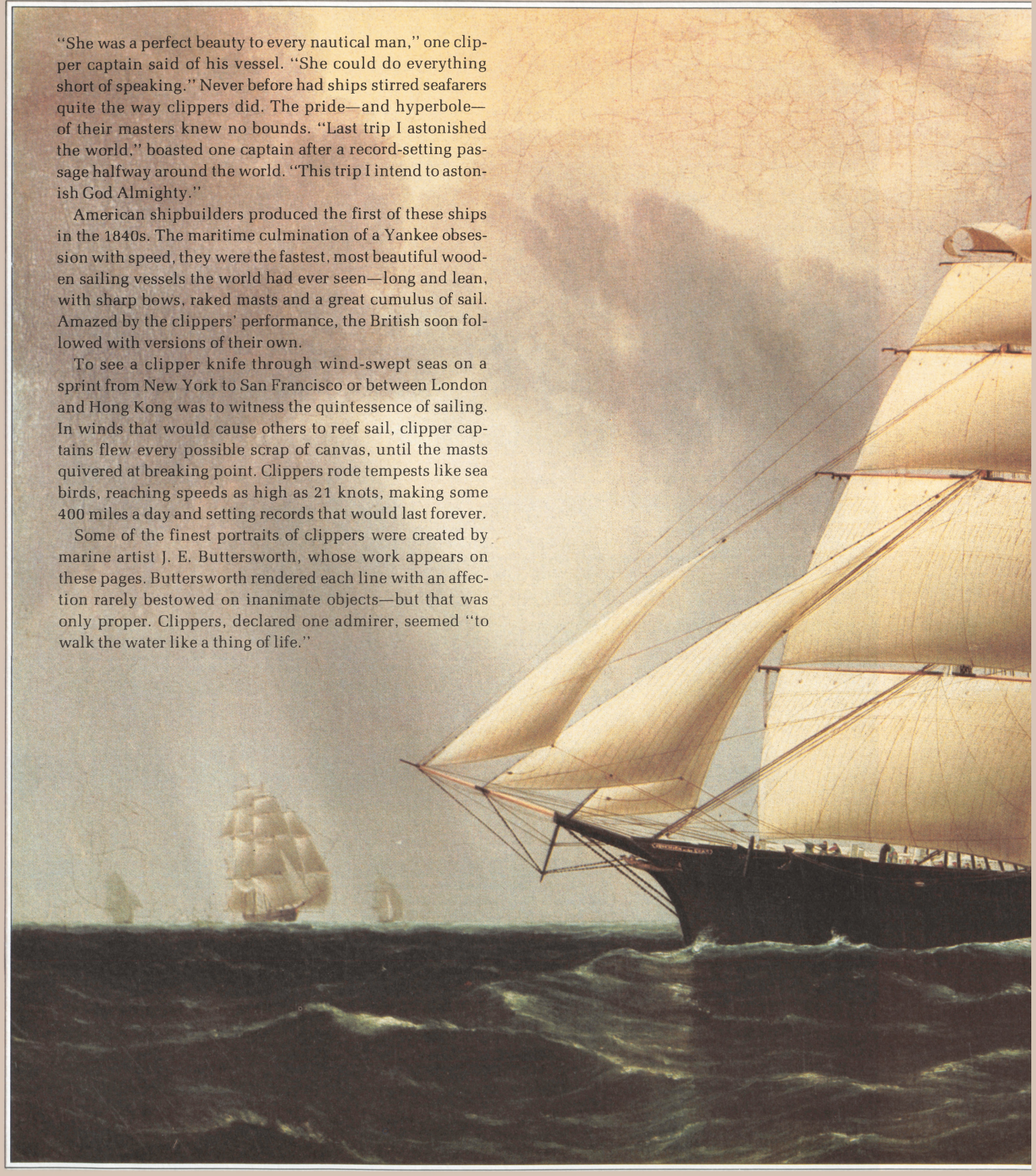
BIBLIOGRAPHY 172

ACKNOWLEDGMENTS 172

PICTURE CREDITS 173

INDEX 174

# Ships to stir the seafaring heart



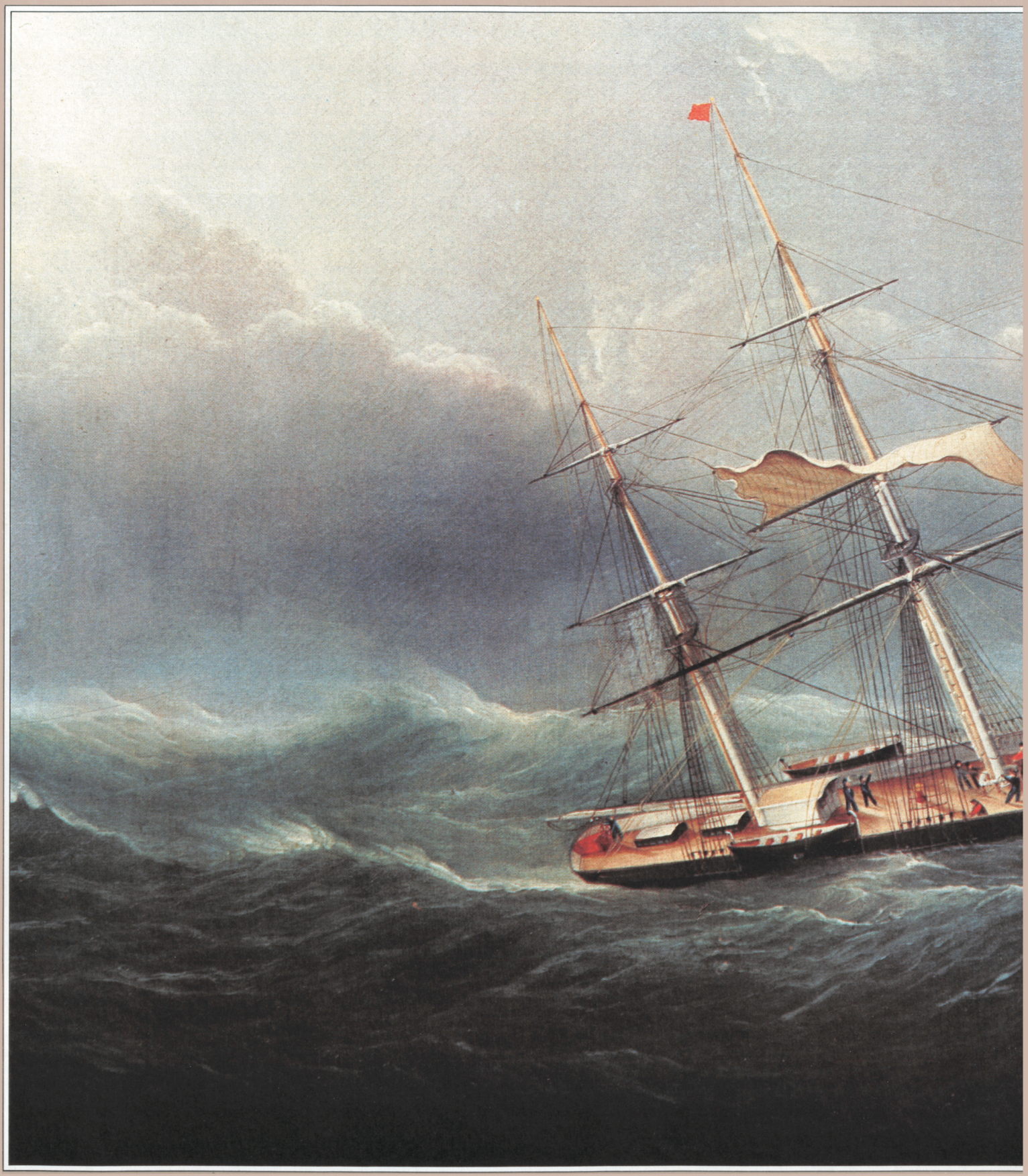
"She was a perfect beauty to every nautical man," one clipper captain said of his vessel. "She could do everything short of speaking." Never before had ships stirred seafarers quite the way clippers did. The pride—and hyperbole—of their masters knew no bounds. "Last trip I astonished the world," boasted one captain after a record-setting passage halfway around the world. "This trip I intend to astonish God Almighty."

American shipbuilders produced the first of these ships in the 1840s. The maritime culmination of a Yankee obsession with speed, they were the fastest, most beautiful wooden sailing vessels the world had ever seen—long and lean, with sharp bows, raked masts and a great cumulus of sail. Amazed by the clippers' performance, the British soon followed with versions of their own.

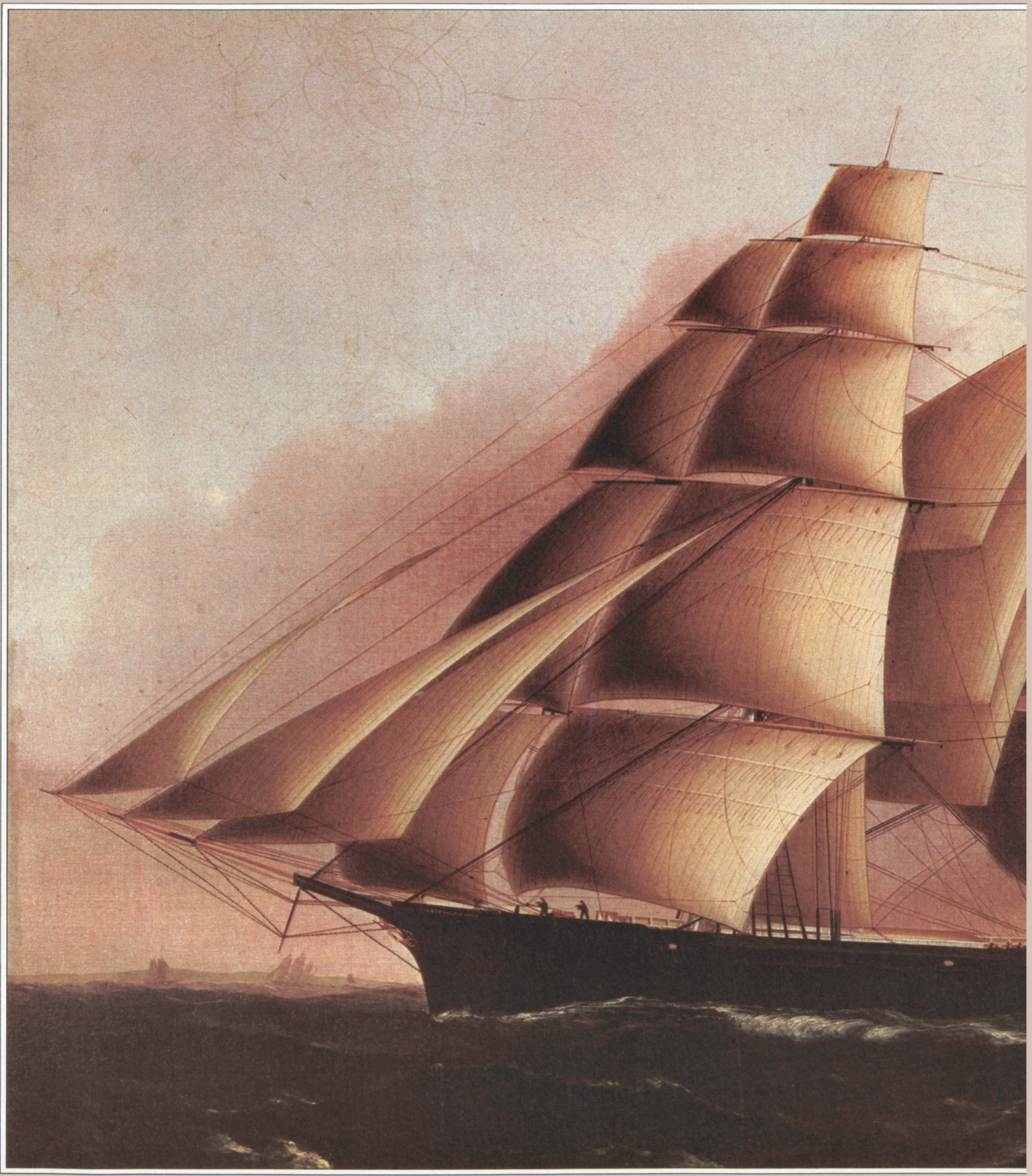
To see a clipper knife through wind-swept seas on a sprint from New York to San Francisco or between London and Hong Kong was to witness the quintessence of sailing. In winds that would cause others to reef sail, clipper captains flew every possible scrap of canvas, until the masts quivered at breaking point. Clippers rode tempests like sea birds, reaching speeds as high as 21 knots, making some 400 miles a day and setting records that would last forever.

Some of the finest portraits of clippers were created by marine artist J. E. Buttersworth, whose work appears on these pages. Buttersworth rendered each line with an affection rarely bestowed on inanimate objects—but that was only proper. Clippers, declared one admirer, seemed "to walk the water like a thing of life."

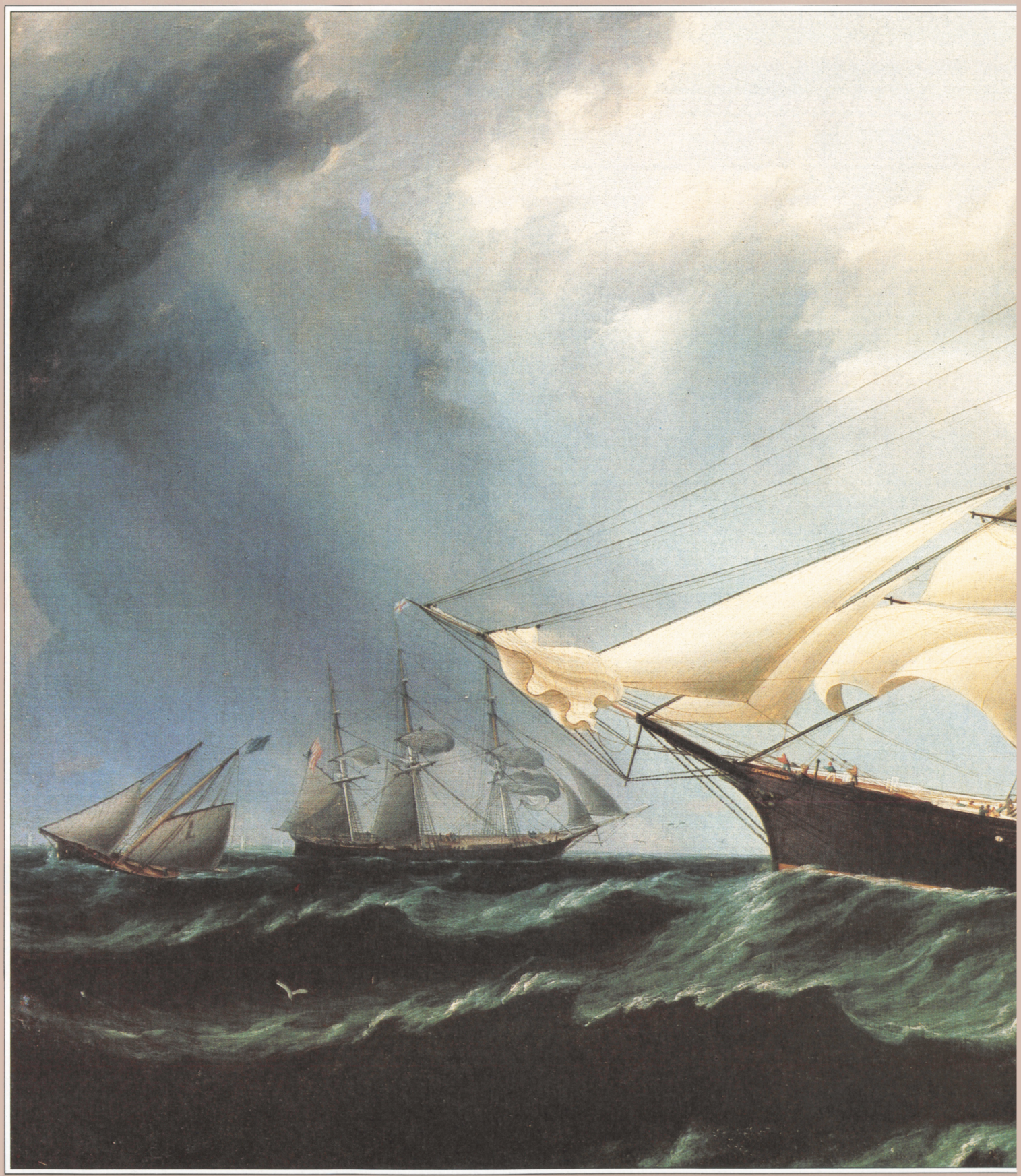
*Bound for San Francisco, the newly launched Sovereign of the Seas hoists her royals in a fresh breeze off New York in 1852. Designed and built by the renowned Donald McKay, she sailed under the command of his brother on her maiden voyage, which took 103 days port to port. Her 258-foot hull displays the concave bow and the champagne-glass stern that were typical of clipper ships. She was acclaimed by The Boston Daily Atlas as "the longest, sharpest, most beautiful ship in the world."*



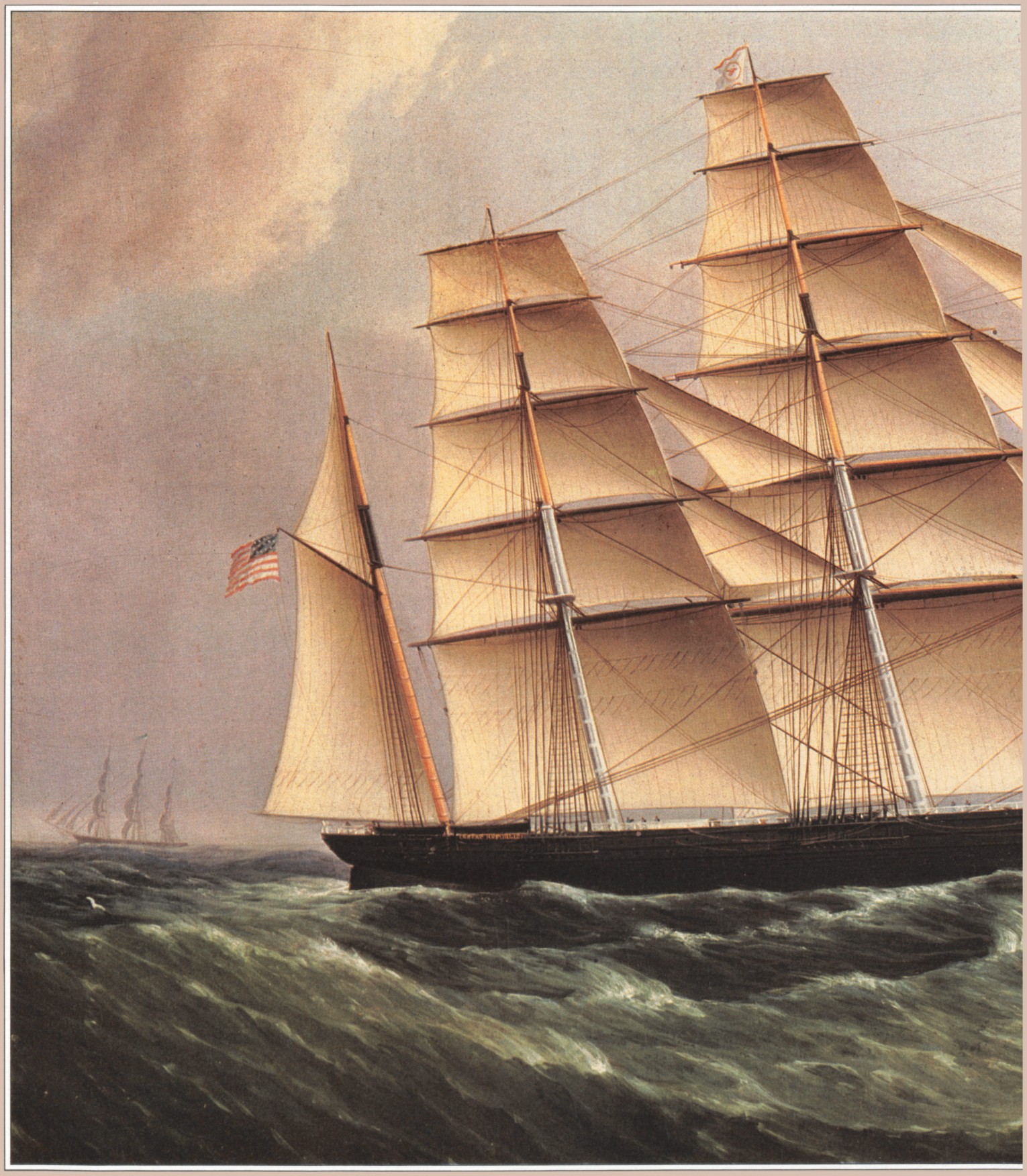
*While a storm jib gives the clipper Young America steerage way in a howling hurricane, her crew labors to haul in the main-topsail, which has flown loose from its spar. Built by the eminent New York shipwright William Webb in 1853, the Young America was a stout ship in bad weather, and once survived being knocked abeam by a whirlwind off Argentina. A favorite of shipping merchants because of her fast passages, she commanded top freight rates, often double what lesser ships earned.*



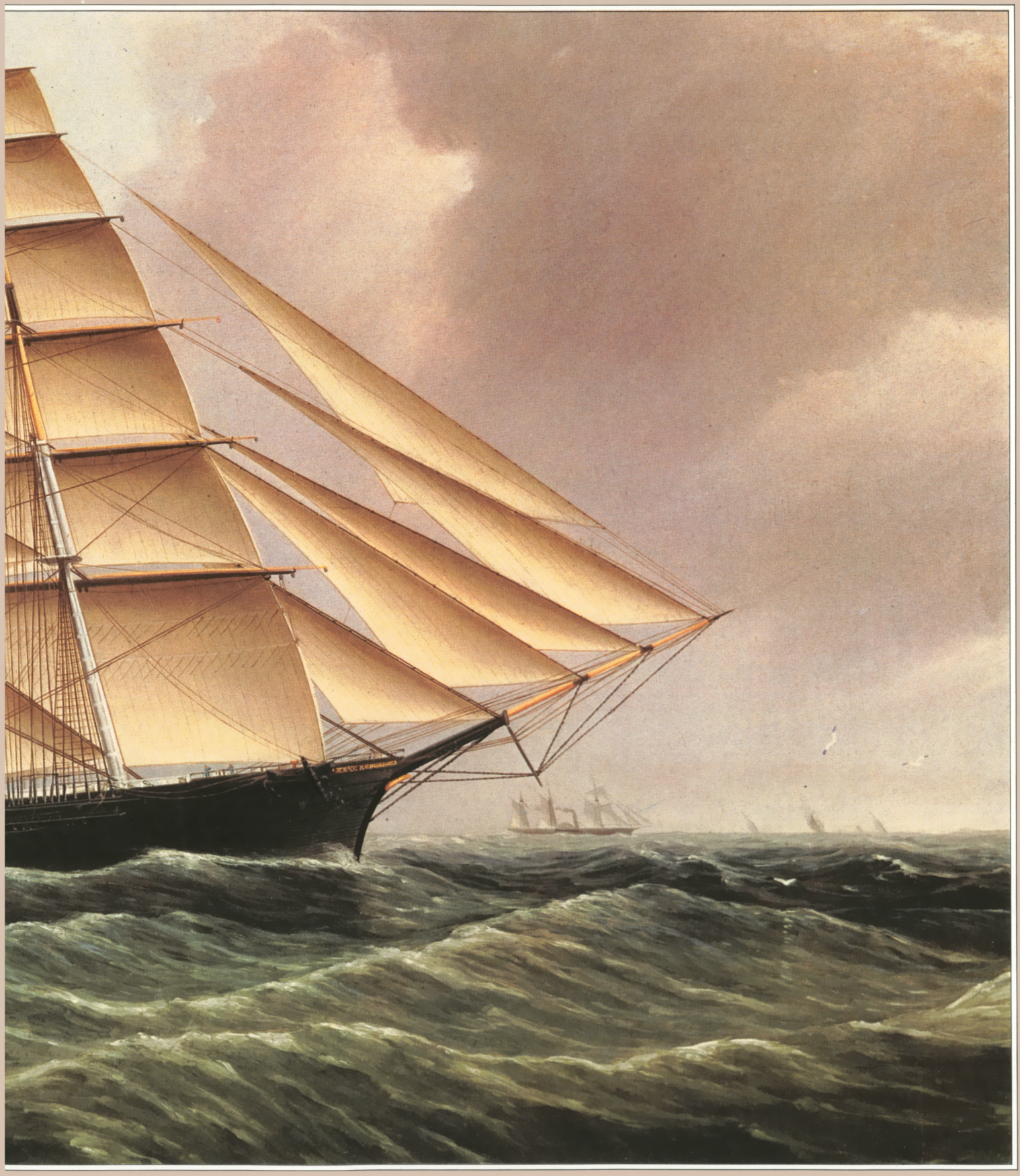
*Despite signs of ominous weather to starboard, the McKay clipper Westward Ho flies a full suit of sails, with triangular jibs at her bow, staysails between her masts, and starboard studding sails outrigged on her mainmast and foremast. Her mizzen course—the lowest square sail on her rearmost mast—remains furled only because it would be blocked on this heading by the huge spanker at her stern. The Westward Ho was so fast, said one sailor, that she ran "like a scared dog."*



*Preparing for a squall, the crew of the clipper Stag Hound takes in sail while another clipper, a schooner and a paddle-wheeler heel through the whiskery chop. The Stag Hound was one of the first of the sharp-bowed, long, "extreme" clippers, ranking as the largest vessel in the American merchant marine when she was launched in 1850. Built by Donald McKay in Boston, she inspired scores of imitators. "Every element in her," stated the Boston Atlas, "has been made subservient to speed."*

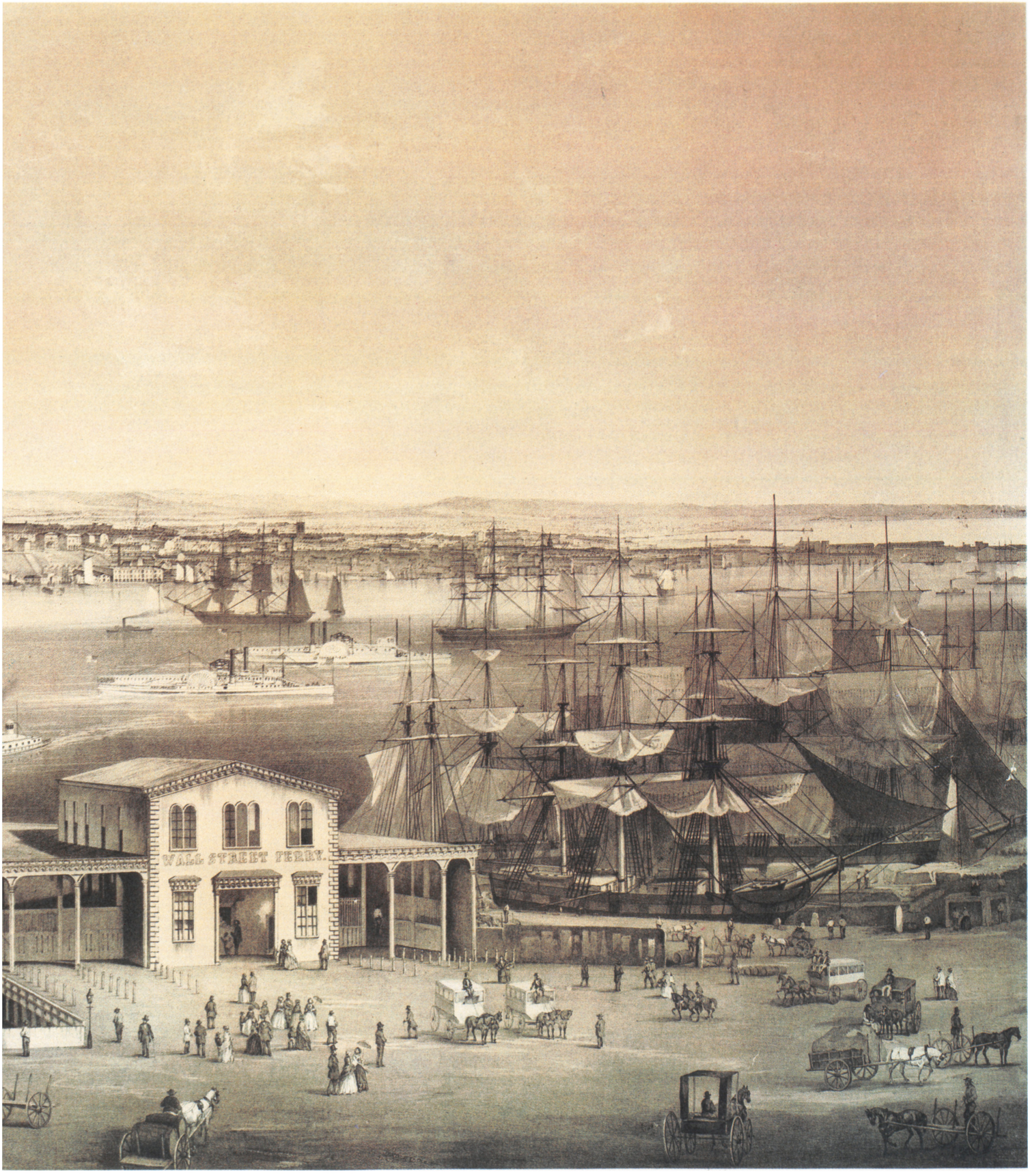


*With four masts, miles of rigging and an overall length of 335 feet, Donald McKay's Great Republic was the largest and most publicized wooden merchant sailing ship ever built in America. Lithograph publishers Currier & Ives commissioned this portrait from J. E. Buttersworth shortly after the vessel's launching in 1853—an event attended by 60,000 people. But just before the giant clipper set off on her maiden voyage, a fire in a bakery spread to her dock and burned her to the water line.*



# The zenith of the age of sail

*Birthplace of the early clippers, New York City's waterfront wears a tranquil air in this 1853 lithograph. Brooklyn is seen beyond the East River.*



In the 1840s a semaphore signal tower stood on Navesink Highlands, 250 feet above the treacherous spit of Sandy Hook, near the entrance to New York Harbor. The highlands commanded a sweep of open ocean bounded on the east by the Long Island shore and on the south by the New Jersey coast. From this height, incoming ships were visible more than 40 miles at sea on a clear day. On the crisp Sunday afternoon of March 25, 1849, a lookout was enjoying the panoramic view from his station under the tower's long, angular arms. The sea was speckled with whitecaps rippling toward the harbor before a fresh south-southeasterly. White sails flickered against the blue water as coastal schooners and brigs picked their way through the channels leading to New York's Upper Bay. Farther off, on the southeastern horizon, one sail in particular caught the eye of the lookout.

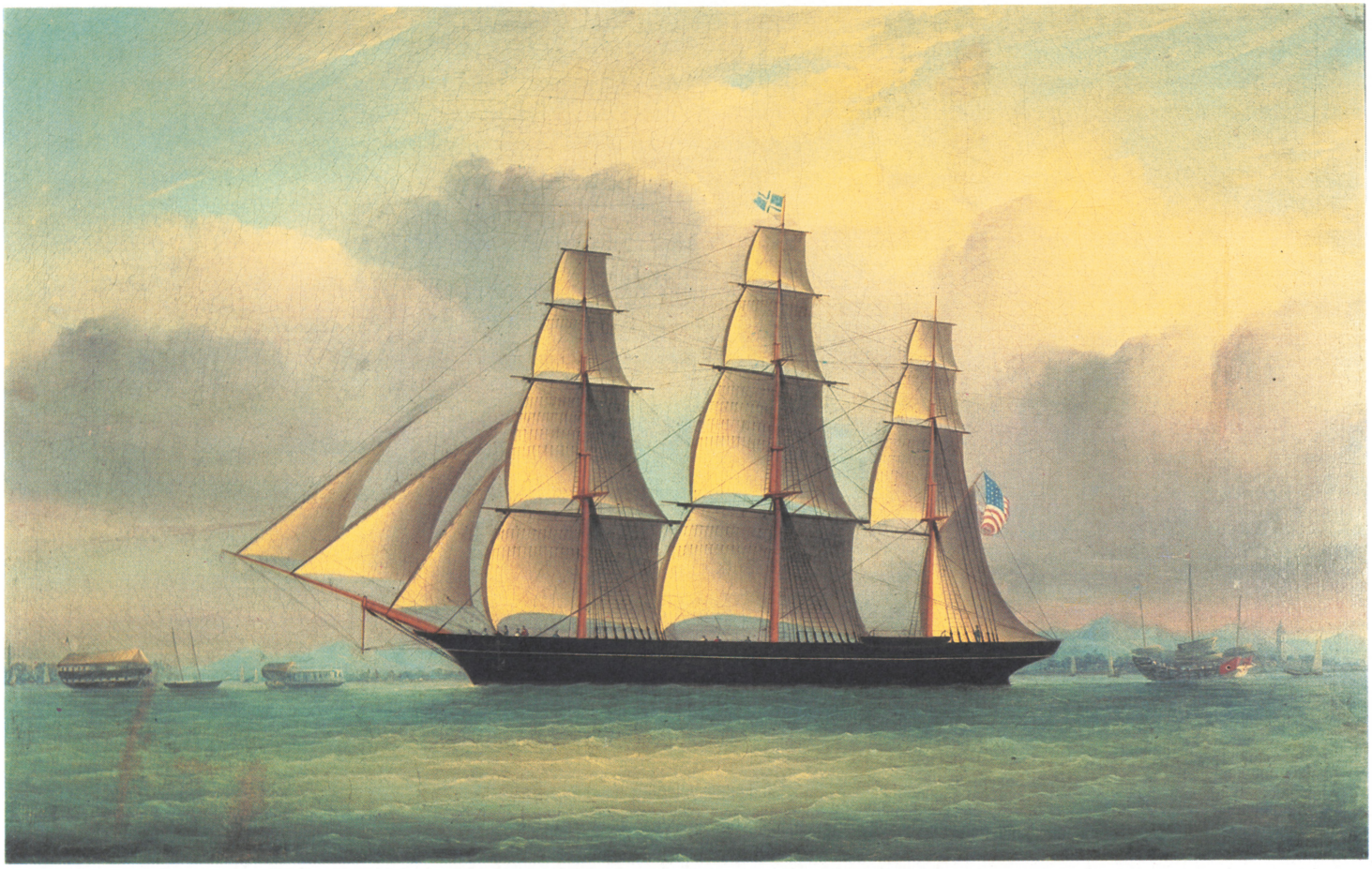
It was merely a white speck at first, but the lookout was riveted by the rate at which it grew: The ship was plainly traveling at great speed. Through his telescope he watched the speck resolve itself into a panoply of sails rising above the horizon, row by row. First, high atop the ship's three slender masts, her tiny skysails appeared; next came her royals; then, under those, her topgallants. Beneath the topgallants flew her wide, wind-taut topsails and mainsails. And puffing out sideways from the tips of her yards were tiers of studding sails.

Now the whole vessel was above the horizon, and there was no mistaking her type. The cloud on cloud of canvas she flung to the wind marked her as one of the awesome new China clipper ships. But, by the lookout's reckoning, none of these ships should be anywhere near New York Harbor this early in the spring. Months before, more than 40 vessels—only a handful of them clippers—had sailed from New York to China to pick up the tea crop, which in that region was usually ready for shipping in January at the earliest. So even the fastest of the returning ships should now be rounding the Cape of Good Hope or, at best, should be somewhere in the South Atlantic. Yet here, amazingly, was one of the clippers from the tea fleet.

On she came, racing before the wind, her acres of sails flashing in the afternoon sun. She looked for all the world like a ship in a painting, so slight was her vertical movement as she closed on Sandy Hook. An ordinary sailing ship would lift her bows and plunge with the seas. Not this one. As her sleek, jet-black hull sliced through the swells, the only visible motion was the white curl at her bow and an occasional toss of spray. She seemed to skim the surface of the water like a gigantic black and white bird—and abruptly she began to fold her wings.

With a flap and a flutter, her studding sails came in from her sides, making her look leaner and trimmer but scarcely reducing her speed. Then, a moment later, a blue and white square of bunting rippled to her masthead, the house flag of Howland & Aspinwall.

The lookout was already certain of her identity; through his glass he had just made out the golden Chinese-dragon figurehead beneath the vessel's bowsprit. Still baffled by her presence, he scrawled a message on his pad for the semaphore operator. The long arms atop the tower creaked out the message, visible across the bay to the telegraph operator



*The Sea Witch, described by The New York Herald as "the prettiest vessel we have ever seen," sails to her anchorage in Whampoa, downriver from Canton, in this Chinese painting. The swift tea clipper made a fortune for her owners and set at least a half-dozen records, some never broken, in her nine-year career.*

on Coney Island, who in turn tapped it out on the line to the Howland & Aspinwall offices in Manhattan. Though the clipper was still more than 20 miles from her berth at the foot of South Street, New York began to buzz with the news that the *Sea Witch* was home.

A pilot schooner came pitching out from the harbor, through the Narrows off Staten Island and past Sandy Hook, to greet the clipper. Up the rope ladder went the pilot who would guide the ship to her moorings. He was the first to congratulate Captain Robert H. Waterman on an astonishing feat: He had brought the *Sea Witch* to New York from Hong Kong, a voyage that only recently had taken up to six months, in 74 days.

This was not the first time that Waterman had broken the record for the run from China to New York. On the *Sea Witch's* second voyage two years earlier, Waterman had raced home from Canton in 77 days. In fact, before the *Sea Witch* had been built, he had brought the swift, rakish cotton freighter *Natchez*—a forebear of the clippers in some respects—from Portuguese Macao, off the China coast, to New York in 78 days. Each of these astounding runs had been hailed as unbeatable by the South Street merchants. Now Waterman had shattered his own best time by three whole days, and some of the old captains who joined the regular gathering at the Astor House bar the next morning asked one another if perhaps Captain Bob had not found some new route home.

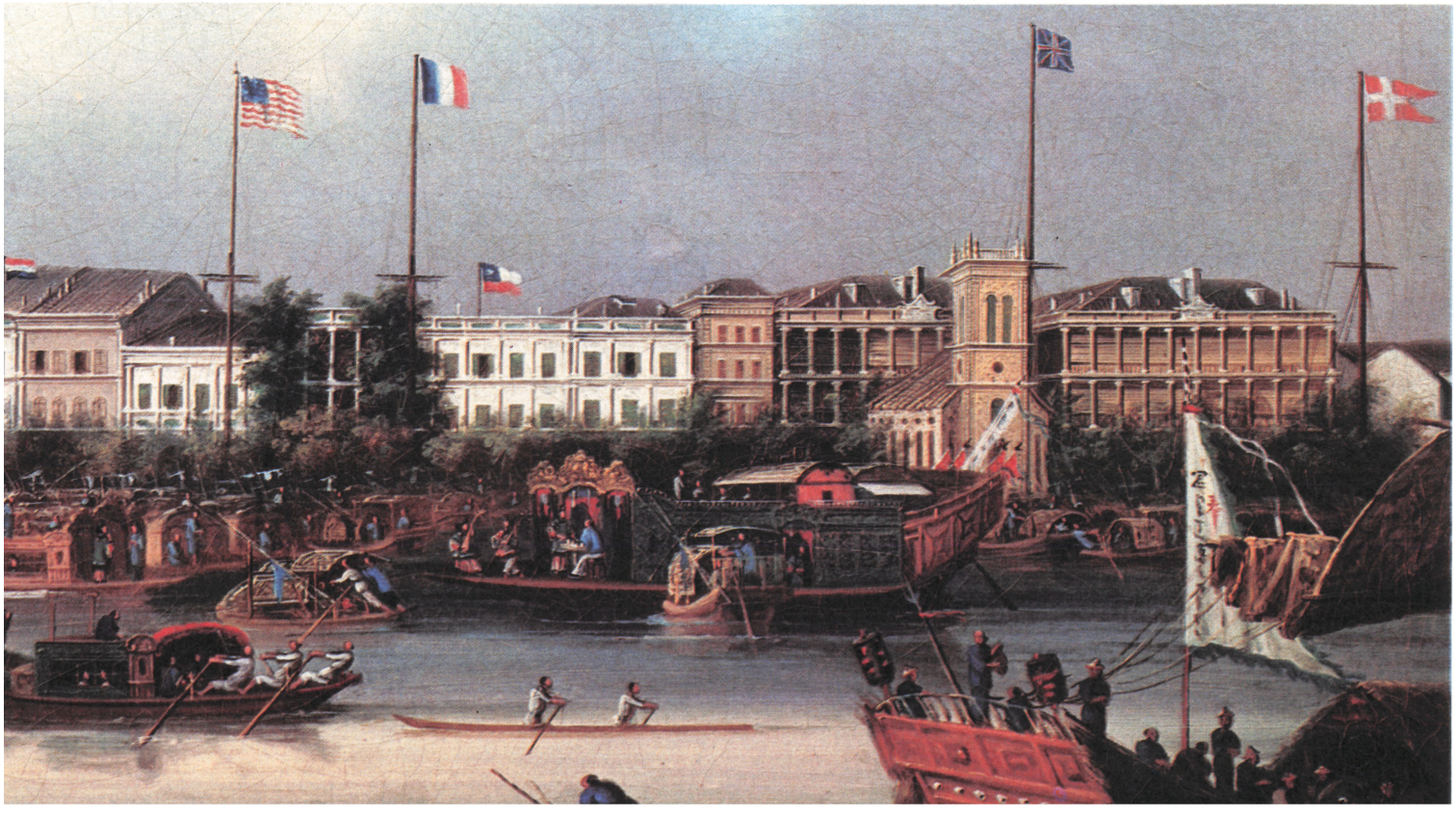
He had not. Waterman had merely demonstrated that merchant sailing was well and truly in the throes of a revolution—and that no man could safely predict how fast these new ships could go. As it turned out, the achievements of vessels like the *Sea Witch* would never be equaled in the history of sail.

For all its glories, the clipper-ship era came and went with a rapidity reminiscent of the oceangoing greyhounds themselves. It started in America in the late 1840s and ended in England only a generation later. And it never would have occurred at all had it not been for a felicitous set of circumstances. A tiny group of designers conceived and perfected the new breed of swift, large ships at the very moment in history when world-wide trade called for just such vessels. And, as an elite group of bold, hard-driving captains arose to command the new clippers, they received invaluable guidance from an American geographer who, by

charting the winds and currents of the oceans, devised new sailing directions that cut days and weeks off long-distance voyages.

The term "clipper" was derived from the word "clip," meaning "pace," as in "to go at a good clip." Long and lean, with knifelike bows, the clipper carried loftier masts and wider sails than ever seen before. With pardonable hyperbole, ship designers and captains claimed that a clipper's soaring sails included moonrakers, cloud cleaners, skyscrapers, stargazers and, atop them all, an angel's footstool.

Builders and owners dreamed up a set of ship names that matched the clippers' speed and breathtaking beauty. Gone were such workaday appellations as *Essex, Ellen,* and *Three Brothers.* The proud new clippers were called *Lightning* and *Stag Hound, White Squall* and *Hurricane, Meteor* and *Flying Cloud, Queen of the Clippers* and *Sovereign of the Seas.* So exultant were some of the names that shipper George Francis



*Junks and sampans glide past the buildings and pennants of the Western trading establishments of Canton. Although business was conducted with bland cordiality, Western merchants had to leave their ships downriver, could not bring firearms or women into the city, and were always under surveillance.*

*The entire story of 19th Century tea production is compressed into this anonymous painting by a Chinese artist. Grown and picked in the hills (top), tea leaves were cured in open sheds (middle), packed in chests and bargained for by merchants (bottom left), then ferried by small boats to the foreigners' ships lying at anchor (far right).*

Train mockingly wrote home from Australia: "*The Wings of the Morning* came in day before yesterday but the *Utter-Most-Parts of the Sea* has not yet been heard from. *Snail, Tortoise* or *Drone* I would suggest for the next clipper. I am tired of these always-a-little-faster names."

The original clipper ships were built solely for the profitable New York-to-China tea trade. With American customers willing to pay a premium for the freshest tea, speed of delivery became a primary concern for merchants. At first, only a few of the most farsighted shipowners were willing to make the huge investments necessary to construct and operate the clippers. Then, just as these vessels proved profitable on the China run, gold rushes in California and Australia drove the demand for express freight sky-high. Scores of new clippers were hurried to completion and sent down the ways. They became longer, leaner and swifter than ever. In the past, few oceangoing vessels had sailed faster than an average of six knots over a sustained period, and sailors had regarded 150 nautical miles as an excellent day's run. But by the 1850s, powerful American clippers routinely made 250 miles a day for days at a stretch. And in 1854 the majestic *Champion of the Seas* blasted 465 nautical miles downwind in a single 24-hour period—an average of almost 20 knots—to set a record that would never be beaten by a sailing ship.

Inevitably the fever spread to England and a fleet of smart British

clippers materialized to defy the elements and to race one another in sail-ripping, spar-cracking, deck-drenching dashes, carrying the tea from China to London or bringing bales of wool from Australia.

Not only did the clippers race one another, they nobly flaunted their canvas in the face of a steadily mounting challenge from the plodding but economical steamship. The oceangoing steamer had in fact preceded the clipper by nearly three decades and in the 1840s was poised to eclipse all merchant sailing ships. But not until the 1880s did one of these steamers attain the speed of the fastest clipper. By that time, most of the great clippers had disappeared from the seas.

The beginnings of the American clipper ship predated the American nation itself. From the colonial period onward, speed was of major importance in American ships. Parliament in London passed harsh laws that restricted colonial trade, and that consequently made smuggling—which required fast ships—highly profitable. During the Revolutionary War the Americans were successful in few naval battles: All but a handful of the vessels in the Continental Navy were sunk or captured. But swift American privateers won glory and profits by harassing British shipping. Similar privateers and fast frigates outsailed the Royal Navy in the War of 1812.

Among the by-products of the second war with Great Britain were the rakish, two-masted Chesapeake Bay privateers. These trim, lively little brigs and schooners of the Chesapeake, modeled on the speedy French luggers and frigates that had helped the American cause during the Revolution, became known as Baltimore clippers. Although they were not called ships by the 19th Century seamen—only three-masted, square-rigged vessels qualified for that appellation—the Baltimore clippers were direct ancestors of the true clipper ships, if only because of the whim of a rich merchant.

*The 19th Century Chinese tea chest above—which, unlike most tea chests, is equipped with a brass hasp so that it can be padlocked—may have been used as a presentation box for an assortment of particularly expensive varieties.*

In 1832 Isaac McKim, a Baltimore trader, commissioned a Chesapeake shipyard to build a three-masted, square-rigged ship that would be modeled on the lines of the local clippers, and yet would be capable of sailing to China. McKim's new ship was large and handsome, sleek in profile, with a low freeboard and a narrow, V-shaped hull. But at 143 feet in length and 494 tons burthen, she could carry only one half the load of conventional full-bodied ships of her size. This did not concern the wealthy McKim, who spared no expense in her building and fitting out. The vessel was constructed with frames of live oak, and her hull was sheathed with copper. Her deck was lavishly adorned with mahogany hatch coamings and brass capstan heads, and her bow was topped with the figurehead of a woman. To McKim's satisfaction, she proved to be a lithe and extremely fast sailer. He named the ship after his wife.

The *Ann McKim* has often been called the first clipper ship. She was not. Her bow was not so bluff as those of the other ships of the 1830s, but it was still round instead of sharp. Her beam was 27½ feet, wider than that of later clippers of her length. And her keel sloped downward, from 11 feet at the bow to 17 feet at the stern, whereas true clippers would be distinguished by flat keels from stem to stern.

Still, there was no doubt that she was something special. With her

svelte lines, she sailed into the wind far better than did most full-bodied, square-rigged ships of her time. In her prime she was considered to be the fastest merchant vessel afloat. But, because of her expensive fittings and limited capacity, she was not copied by other shipbuilders, who regarded her as a rich man's indulgence, Mr. McKim's pet ship. When the old grain merchant died in 1837, the *Ann McKim* was sold to the New York firm of Howland & Aspinwall, which by then was looking for fast ships to add to its China fleet.

Enter John Willis Griffiths. Son of a shipwright, he had been employed at Virginia's Portsmouth Navy Yard before moving to New York to work for the esteemed shipbuilding company of Smith & Dimon. An open-faced, genial young man with a genius for mathematical insights into shipbuilding problems, Griffiths became fascinated by the physical laws that apply to how a ship proceeds through the water. In the Smith & Dimon offices, Griffiths investigated the studies of an Englishman, Colonel Mark Beaufoy, who had tested the resistance of different solid objects when they were towed in a water tank. Beaufoy had determined that increasing the length of an object "exceedingly diminishes the resistance with which it moves." And, without applying his theories directly to ship design, Beaufoy recommended that "the bottom of a floating solid should be made triangular," or V-shaped, along its whole length.

By 1840 Griffiths had devised his own testing tank to duplicate Beaufoy's experiments and to measure the resistance of various shapes. He quickly became convinced that many of the accepted principles of ship design were wrong.

"Cod's head and mackerel tail" was the popular description of the hull that had dominated merchant sail for two centuries. The round cod's-head bow smacked and battered the waves as the ship moved through the water, riding up and over each crest. The narrow stern of the hull left a clean wake with a minimum of visible turbulence. Griffiths recognized that this design made a safe ship, comparatively dry on deck because the seas were shouldered aside. Dependable it was, but fast it was not, no matter how large the ships or how great their sail area. There was a limit, Griffiths concluded, to what sails alone could accomplish, because of the resistance of the round-bowed hull.

At the drafting tables of Smith & Dimon, Griffiths began to work on the design for a swift new vessel. Studying the lines of the *Ann McKim*, he deduced that it was her lean hull and narrow bow that made her faster than most of her contemporaries. A vessel with an even-sharper bow should therefore be an even-faster ship. Griffiths also envisioned a long, gracefully tapered hull, with the greatest breadth farther aft than on any earlier ship. And he was convinced that his tank tests had told him something more—that the finlike mackerel tail of most ships was causing drag, an invisible form of suction under their sterns that held them back. Griffiths' ship would have a stern with a fuller shape, so that the water running past the long, thin hull would slide smoothly astern.

Published in an influential shipping journal, Griffiths' theories were at first violently scorned by many older designers and ship captains. A cardinal principle of ship design, Griffiths' critics all affirmed, was that the bow must surmount the waves as it moved forward. Allow it to dig

## An ugly war that led to the clipper era

"This war with China," protested the English educator Thomas Arnold, "seems so wicked as to be a national sin of the greatest possible magnitude." The Opium War of 1840-1842 was wicked indeed: By military force the British were trying to compel China to accept imports of an addictive and destructive drug. By one of history's ironies, that reprehensible campaign contributed mightily, if indirectly, to the advent of the glorious clipper era.

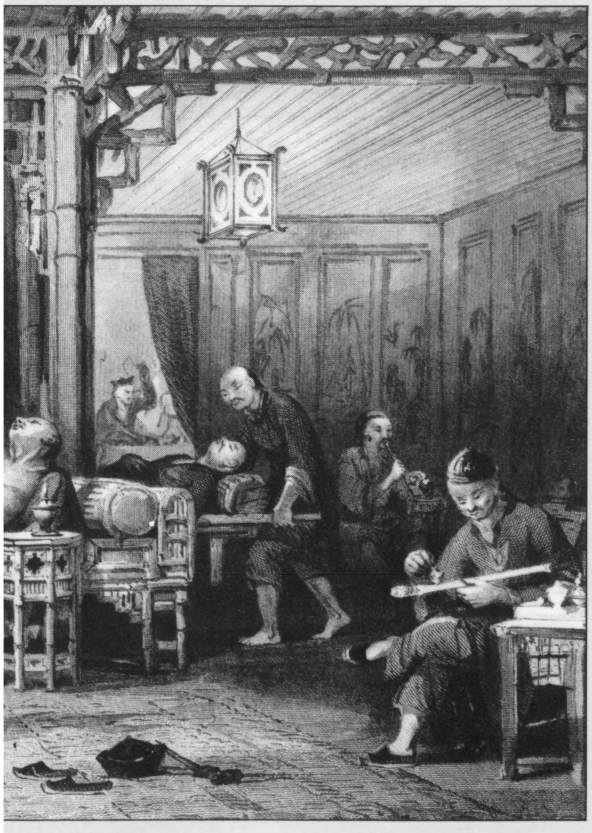
Britain's East India Company began shipping Indian opium into China in the 1780s. Six decades later, demand was so great that China's annual payments for what a Chinese leader called "this vile and poisonous substance" exceeded the country's profits from tea exports by three million dollars. The human costs of the trade were as grimly apparent as the economic costs. One British observer, visiting a smoking house, reported: "The couches are filled with occupants who lie with an idiot smile upon their countenances. A few days of this fearful luxury will impart a haggard look to the features; a few months will change the strong man into a skeleton."

In 1839 a high-ranking Chinese official, enraged by

Britain's refusal to curb the opium traffic, ordered all stocks destroyed. Imperial soldiers seized 20,000 chests of the drug from English merchants and cast their contents into the Pearl River at Canton. There followed two years of naval skirmishes, in which China's antiquated junks proved hopelessly outmatched by Britain's warships. Forced to sue for peace, China signed the humiliating Treaty of Nanking in 1842. In addition to mandating the resumption of opium imports, the agreement ceded Hong Kong to Britain and opened five other ports to foreign commerce.

France and the United States then insisted on similar trade concessions. The British kept control of the lucrative opium traffic (they stayed in the business until 1915), but there was money to be made from trading in other products. American ships were soon plying the China route in increasing numbers, bringing back tea and handcrafted goods. The perishability of tea inevitably led to a need for faster ships, and America's clipper builders answered the call.

*Inside a Chinese opium den the proprietor offers a pipe to an addict, while other users loll in dreamy lassitude.*



too deeply, they said, and the ship would slide into a solid wall of water beneath the wave crests. Smart young John Griffiths had worked out some interesting concepts in the flat calm of his testing tank, they conceded, but if he ever saw a ship plow into the 50-footers off Cape Horn, he would forget about his sharp bow. It would cut through those combers, all right—bringing them down onto the deck and imperiling the ship.

But Griffiths was convinced that a ship of his new design would be seaworthy as well as fast, and he set out to get a commission. In February of 1841 he prevailed upon the American Institute, a headquarters of marine architecture in New York, to exhibit a small-scale model of the ship he had in mind. Griffiths had no immediate takers for his model but, unbeknownst to him, events were occurring on the other side of the world that would prompt a pair of enterprising merchants to take a chance on his design.

About a year after Griffiths' model went on display in New York, British troops won a bloody victory in Canton, China, ending the two-year Opium War. Before the War, foreigners could trade with China only at Canton, and there under tight restrictions. Now a peace treaty ceded Hong Kong to the British and opened up four ports—in addition to Canton—to traders from all Western nations: Amoy, Foochow, Ninghsien and Shanghai. As a result, New York shipbuilders were swamped with orders for new vessels capable of making the voyage down the Atlantic, around the Cape of Good Hope, across the Indian Ocean, up through the China Sea and back, a round-trip distance of some 30,000 miles.

Americans were becoming avid customers for Chinese goods—tea, silks, cinnamon, firecrackers and much more. The United States, now more than half a century old, had entered an age of prosperity, and there was money to be had for luxuries as well as necessities. In Boston, Philadelphia and New York, city dwellers were forming an acquaintance with the many different varieties of Chinese tea—Hyson and Bohea, Imperial and Gunpowder, Lumking and Mowfoong—and were also learning about their perishability; the most delicate teas became moldy in sea air. With the East Coast cognoscenti clamoring to pay large premiums for the freshest tea, merchants began paying more to shipping companies that could deliver it within a few months instead of half a year. Suddenly there was money to be made for each day saved in transportation. Moreover, there was the promise of fabulous profits to the owners of the first tea-laden China trader to reach New York with samples of the new year's crop.

Among the shrewdest shippers were the Messrs. Howland and Aspinwall of New York, who had been in the China trade more than a decade. By 1843 they were dispatching several ships to Canton every autumn to await the first tea pickings and rush home. With the profitable tea market growing by leaps and bounds, Howland and Aspinwall decided to add another ship to their China fleet. Dreaming of the killing they could make with a vessel that was both large and fast, they decided to build a ship based on Griffiths' proposals. They commissioned the new ship from Smith & Dimon. She would be called the *Rainbow*.

The *Rainbow's* ribs were hardly rising from her keel when word of her

*Shipwrights and laborers swarm over New York City's vast, timber-strewn Smith & Dimon shipyard in this 1833 painting. A few years later, designer John Griffiths would rise from their ranks to become a pioneer of clipper ships. For both his work at the drafting board and his writings—he was editor of the periodical American Ship—Griffiths was widely regarded as the era's greatest contributor to the science of shipbuilding.*

radical design spread along the New York waterfront, and soon a steady stream of merchants, ship designers and captains were ambling down to the Smith & Dimon yard to have a look. The older salts could scarcely believe their eyes. The new ship was as massive as the biggest Atlantic packets. But her bow was as sharp as that of one of the pert little Baltimore clippers, nearly concave on each side, and her stern timbers were rounded like the apple-cheeked bow of a proper ship. The *Rainbow* must be turned the wrong way around, they muttered. Put her rudder at the other end, sail her backward and she might get somewhere. Otherwise she would drive into the first big ocean swell she met and plunge straight for the bottom. Even the vessel's rigging irked the oldtimers: The tall masts Griffiths had designed would go by the boards with the first puff of a gale. A death ship if there ever was one, the veterans predicted, and soon they were calling her "Aspinwall's folly."

So pervasive was the criticism that William E. Howland and William H. Aspinwall grew faint of heart. Aspinwall decided to consult outside experts, particularly on the subject of those soaring masts. He dispatched an agent to England to obtain a second opinion about Griffiths' proposed combination of slim hull and lofty spars. In the meantime, work on the *Rainbow* slowed and Griffiths' new wonder waited, in danger of being stillborn, in the Smith & Dimon yard. What Messrs. Howland and Aspinwall did not know was that the *Rainbow's* competition was already taking form.

While Griffiths had been drafting his intricate designs on paper, a burly, hawk-eyed, sideburned veteran of the quarter-deck had been whittling away at a block of white oak, shaping a model hull that represented his own ideas for a ship that would excel on the China passage. Relying less on equations and coefficients than on his own practical observations, Captain Nathaniel B. Palmer was reaching conclusions that were just as radical as Griffiths'.

Captain Nat, senior to Griffiths by 10 years, had long familiarity with the sea. His childhood playground was his father's shipyard in Stonington, Connecticut, and he grew up sailing catboats on Long Island Sound. He first went to sea at 14 aboard a blockade runner in the War of 1812, then shipped out at 19 on a Stonington sealer. In 1820, at the age of 21, Palmer commanded his own sloop, the *Hero*, on a sealing voyage that took him so far down the South Atlantic that he became one of the first persons in history to sight the mainland of Antarctica. Palmer went on to build a reputation as an effective master during the 1830s, when he skippered cotton packets between New York and New Orleans and general cargo packets between New York and Liverpool. In January 1843 Palmer got his first opportunity to sail on the lucrative China run; his vessel was the bluff-bowed packet ship *Paul Jones*. During her plodding passage he began to speculate on the design of a ship that could make the run much faster.

Palmer's instinctive idea for a new sailing ship bore a striking resemblance to Griffiths' design for the *Rainbow*, with one significant difference. Besides a sharp bow and narrow beam, Palmer's hand-carved hull had what he called a "flatter floor." The inspiration for this feature came

from the cotton ships Palmer had skippered for years: They had flatter bottoms than most vessels—for two reasons that had nothing to do with a deliberate design for speed. First, the cotton carriers' shallow draft enabled them to slip over the great bar of sand and mud at the mouth of the Mississippi River leading to New Orleans—a barrier that would thwart any large, deep-keeled, V-bottomed vessel. Second, the flat bottoms of these vessels allowed more efficient packing of the rectangular cotton bales. According to ship-design tenets of Palmer's day, the cotton carriers should have sacrificed a certain amount of speed for these advantages—but they did not. In fact, they had set new speed records for the run from New Orleans to New York.

During Palmer's stint on the transatlantic run in the 1830s, he had persuaded shipowner Edward Knight Collins to commission a couple of flatter-bottomed ships for the Liverpool trade. Palmer was convinced that a ship so designed would be able to outrun the conventional full-bodied packet ships that had dominated the route for the past 20 years. Soon Collins' Dramatic Line ships were averaging faster passages than any of the competition's.

Their flat bottoms, in fact, may have had nothing to do with their speed. Hydrodynamicists never have been able to determine if a flat-bottomed hull outperforms a hull with a V-shaped bottom. The Dramatic Line ships may have been faster simply because they were longer; marine architects do know that increased length definitely does permit a greater maximum speed. But while other factors may have been responsible, flat bottoms appeared to make Collins' Atlantic vessels faster—and Nat Palmer's subsequent espousal of this feature for ships on the China run would win almost universal acceptance.

Aboard the *Paul Jones* on its 1843 voyage was one William H. Low, who had been in Canton representing the New York shipping firm of A. A. Low & Bro., in which he was a partner. As the *Paul Jones* slowly made her way halfway around the world, Palmer and Low had many long evenings together. Settling back in the stateroom's leather couch, they would light up their after-dinner Havanas and study the merits of Palmer's ship model.

William Low had as much foresight as Messrs. Howland and Aspinwall, plus the courage of his convictions. The *Paul Jones* had hardly tied up to her wharf on the East River when A. A. Low & Bro. commissioned the Brown & Bell yard—located at the foot of Stanton Street, less than a mile from where the unfinished *Rainbow* sat in her stocks—to lay the keel for a ship patterned on Palmer's whittled model. And while the *Rainbow's* construction continued to be held up by the trepidant firm of Howland & Aspinwall, the A. A. Low & Bro. ship was rushed to completion. She was launched Friday, May 3, 1844, and was named the *Houqua*, after a much-admired Chinese merchant of Canton who had died the previous year.

At the *Houqua's* launching, *The New York Herald* called the ship "as sharp as a cutter—as symmetrical as a yacht—as rakish in her rig as a pirate—and as neat in her deck and cabin arrangements as a lady's boudoir. Her figurehead is a bust of Houqua, and her bows are as sharp as a pair of Chinese shoes."

*The image of urbanity in this portrait, clipper captain Nathaniel B. Palmer was so rugged that he sometimes stayed on deck continuously for weeks in stormy weather, catching short naps in a topside armchair. He had canniness to match: In his periodic role as a clipper designer, he secured a share in the ships he built, and so became one of New York's leading merchants.*

Was the *Houqua* a clipper ship? Not quite. But she was a long, lean, lofty-sparred forerunner, perhaps a greater departure from all her predecessors than the true clippers would be from her. With Captain Palmer on her quarter-deck, the *Houqua* sailed for Canton on May 31, 1844. She reached her destination in 95 days, 16 fewer than Palmer had taken on the *Paul Jones* the previous year. Her 90-day voyage home beat the *Paul Jones's* time on the same run by 23 days.

Although neither Howland nor Aspinwall ever admitted it, the launching of the *Houqua* must have helped persuade them to give the final go-ahead to Smith & Dimon to complete the *Rainbow*. By the time Aspinwall's expert had returned from England with a suitcase full of rigging plans, the *Rainbow* was nearly finished, and Griffiths shoved the British blueprints into his drawer. The *Rainbow* was launched on February 22, 1845, nearly nine months after the *Houqua*. The *Rainbow*, too, was more an immediate progenitor than a true clipper—sharper, leaner and loftier than any other large ship, even the *Houqua*, but not so extreme as the vessels that were to follow. Under the command of veteran Captain John Land—in his fifties and known to his crew as "Old Man Land"—the *Rainbow* sailed for China with high expectations for a speedy voyage.

Only a few days out of New York she suffered a setback. Piling on the canvas, Old Man Land, who by one account never opened his mouth except to bellow orders, had sent her racing down the Atlantic. Then, at the height of a stiff gale, all three of her topgallant masts came crashing down with a sickening series of cracks and bangs. Chopping through the tangle of lines, Land and his crew fished the spars aboard and repaired the damage while the *Rainbow* limped along under jury rig.

The mishap foreshadowed many such accidents that would occur during the clipper-ship era: So finely tuned were the new vessels' spidery networks of shrouds and spars that many clippers lost their tophampers during their first voyages, before their captains had an opportunity to judge the amount of canvas the ships were capable of carrying under various weather conditions.

On this occasion the performance of the *Rainbow* was diminished by another factor. Because of the delay in her construction, she had sailed in the wrong season, leaving New York in the dead of winter and reaching the China Sea at the time of the adverse monsoon. Forced to tack into the teeth of the season's prevailng northeast winds, Captain Land took 102 days to reach Hong Kong. By the time he began the return journey with a valuable cargo of pekoe tea, the monsoon had shifted and the *Rainbow* had to sail into southwest winds. Still, she made the trip in 102 days. On that run, Land reported, his ship had attained speeds of 14 knots. Moreover, the *Rainbow* had set a new record for the whole passage out and back. And in just one voyage she had earned profits equal to twice the cost of her construction.

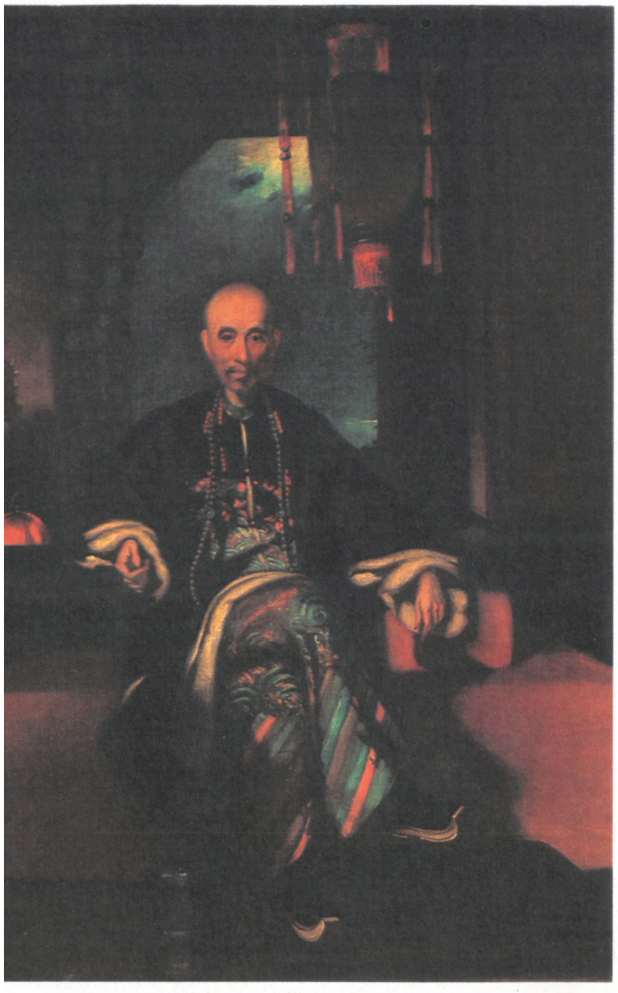
On her second voyage, that same year, the *Rainbow* made Hong Kong in 99 days and raced for home two weeks later with another cargo of tea. Storming up the Atlantic, Captain Land raised Sandy Hook in only 84 days, before any other returning ship had brought New York the news of the *Rainbow's* safe arrival in China. "We met no ship that doesn't know

the looks of her heels. The vessel will never be built that can beat her," Old Man Land crowed to anyone who would listen.

This boast would soon prove exceedingly hollow. Howland & Aspinwall had already committed itself to faster ships that would outclass even the *Rainbow*. In fact, hardly had Captain Land departed on his first voyage than the *Rainbow's* owners commissioned Smith & Dimon to lay the keel for a new racer to send to China. Howland & Aspinwall ordered the new ship shortly after the firm's most famous captain, Robert H. Waterman, had electrified South Street by romping home from Portuguese Macao in only 78 days. His ship was the 130-foot cotton packet *Natchez*, one of the original speedy flatbottoms whose performance had so intrigued Captain Nat Palmer. It was true that Captain Bob had drawn a charmed lot of winds from Aeolus' bag on that run. In fact, he had not needed to tack the *Natchez* once during the entire voyage. Under normal conditions a packet like the *Natchez* would have taken weeks longer to cover the distance. At the end of that voyage, Waterman received a hero's greeting from New Yorkers, who were captivated by the vision of China only 11 weeks distant. And if Waterman could make a record like that in the 14-year-old *Natchez*, Howland and Aspinwall wondered, what could he do in a sharp new ship?

*The name of the venerated Cantonese merchant Houqua (right) was given to a clipper-ship precursor (below) and also became a synonym for integrity. Poor at birth, Houqua managed to amass a fortune of $26 million through impeccably honest dealings with Western traders.*

*The merchant ship Houqua loses her mainmast and upper sections of her mizzenmast as she heels over in a raging storm. In a 20-year career, the Houqua made handsome profits for her owners, A. A. Low & Bro., but encountered more than her share of misfortune—including being struck by a meteor. She eventually vanished after leaving Yokohama in August 1864.*



Again they turned to designer Griffiths. This time, however, Griffiths worked with Captain Waterman, who devised the new ship's rig and sail plan. It was a perfect match—the brilliant engineer and the daring captain—and the melding of these two talents produced what can properly be called a true clipper ship.

The *Sea Witch* had a bow even sharper than that of the *Houqua* or the *Rainbow*. Her hull lines were as rangy as a pedigreed whippet's. At 170 feet 3 inches in length and 33 feet 11 inches in breadth, she was almost exactly five times longer than she was wide (the length-to-breadth ratio of most packets was about 4 to 1). Perhaps because of the *Houqua's* great success, Griffiths gave the *Sea Witch* a flatter floor than that of the *Rainbow*. Above the water line the new ship's bow flared outward in graceful concave curves. No full-bodied bulges marred her midship lines, and her sleek stern was capped with a short, overhanging transom. Painted black with a single gold stripe, she sported an aggressive Chinese dragon for her figurehead. The *Sea Witch* was launched on December 8, 1846. She was Griffiths' masterpiece.

Yet it was Captain Waterman's contribution that provided the power to drive the *Sea Witch's* hull. At Waterman's behest, Griffiths made the *Sea Witch* the loftiest ship afloat. Her mainmast soared more than 140 feet, as tall as a 14-story building. It carried the usual mainsail, topsail and topgallant, with a royal above them, and atop them all a cloud-scraping skysail. The foremast and mizzenmast also carried five tiers of sail each. In addition, the *Sea Witch* was equipped to carry studding sails—called stunsails by seamen—on extended yards that reached out on both sides of her normal rigging, even up to her royals. The gaps between her masts were filled with a number of triangular staysails, and the stays leading out to the tip of the ship's long bowsprit were hung with an assortment of jibs and flying jibs. Finally, large spanker sails could be hoisted up the mainmast and mizzenmast for sailing close to the wind. Waterman's rig called for more sails than were normally used by a 74-gun warship three times the *Sea Witch's* size.

The *Sea Witch*, like her predecessor the *Rainbow*, attracted many visitors while she rose in her stocks in Smith & Dimon's yard. Captain Nat Palmer walked around her and gave his opinion that she was "likely to prove very swift afloat," although, he cautioned, her intricate rig could be sailed only "at great expense, to say nothing of wear and tear." Whatever the expense, Howland and Aspinwall expected handsome returns. So lucrative had the China trade become that they sent the *Sea Witch* off to Canton in a northwest gale, in December 1846, knowing full well that she would have to beat against the winter monsoons to reach China and that she would arrive too late for the first tea pick of 1847.

No doubt Captain Bob Waterman had a part in this decision, so anxious would he have been to set sail. Throughout his career, Waterman was in a hurry. A New York native, born on March 4, 1808, he shipped out at the age of 12 as a cabin boy aboard a China trader. He went swiftly up the ladder of promotion on the rigorous transatlantic packets, where many of the clipper captains would get their training. By 1829, at 21 years of age, he had earned the prestigious rank of first mate on the famous packet *Britannia*. Aboard that ship Waterman gained a reputa-

# The bloodlines of an American thoroughbred

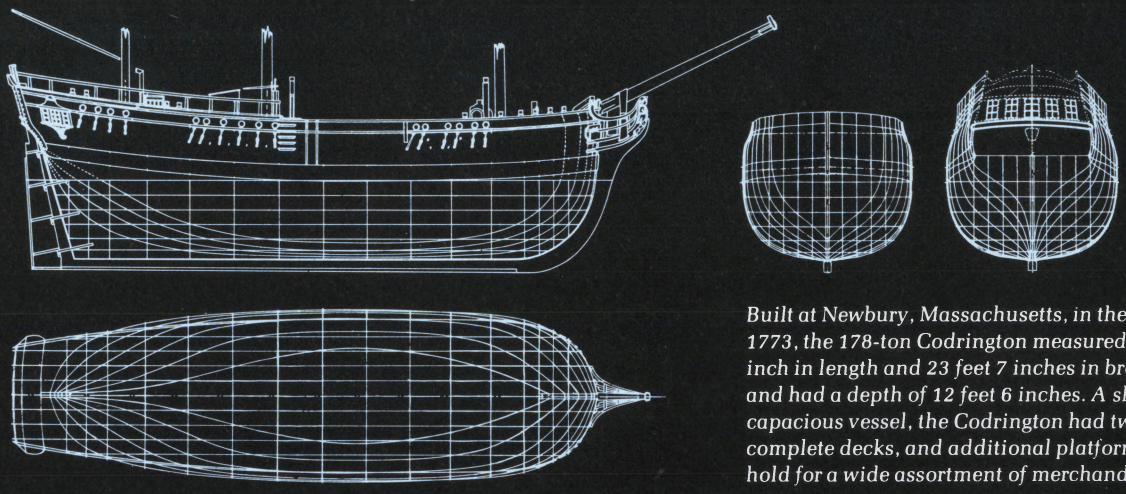
When the first clippers appeared in America in the 1840s, they so astonished the world that they were hailed as a new breed of vessel. In actuality, the hull designs of these ships had evolved from three earlier sorts of American craft, shown here in profile views adapted from marine architectural drawings called lines plans. The drawings portray a vessel from the side, bottom, bow and stern. Each view includes three sets of lines—two straight and one curved—that indicate regularly spaced sections of the hull in three dimensions and convey an accurate impression of shape, much as do topographical lines on a map.

Typical 18th Century American-built ships such as the *Codrington*, directly below, were modeled after British merchantmen of the period. Short, bluff-bowed craft with well-rounded cross sections, these vessels could easily poke in and out of small American harbors, delivering goods from England and taking on colonial cargoes.

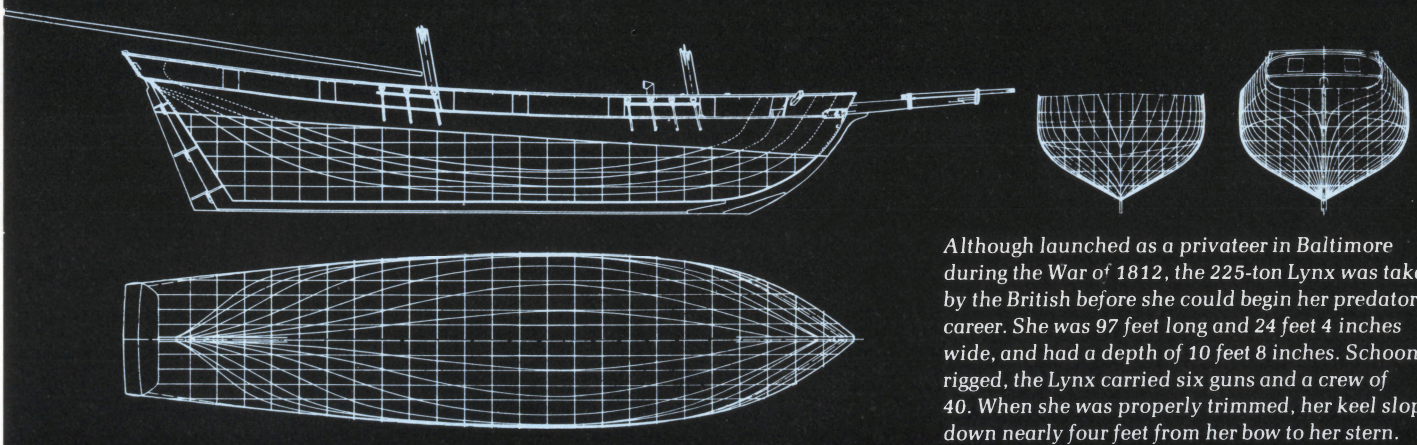
The war that broke out between Britain and France in 1793 crossed the Atlantic in the form of harassment of American shipping, prompting United States builders to construct hundreds of sharp-bowed brigs and schooners ideal for privateering and blockade running. During the War of 1812, these vessels came to be called Baltimore clippers because so many were built in that city; at the bottom of this page they are typified by the *Lynx*.

With the coming of peace in 1815, transatlantic trade was resumed in earnest, and by the late 1820s New York and Boston shipping firms were energetically competing for business, promising fast and regular service. The ships born of this competition were the giant Atlantic packets such as the *New York (top right)*. While full-bodied amidships for efficient cargo stowage, the new packets were longer, slimmer and faster than older merchant ships.

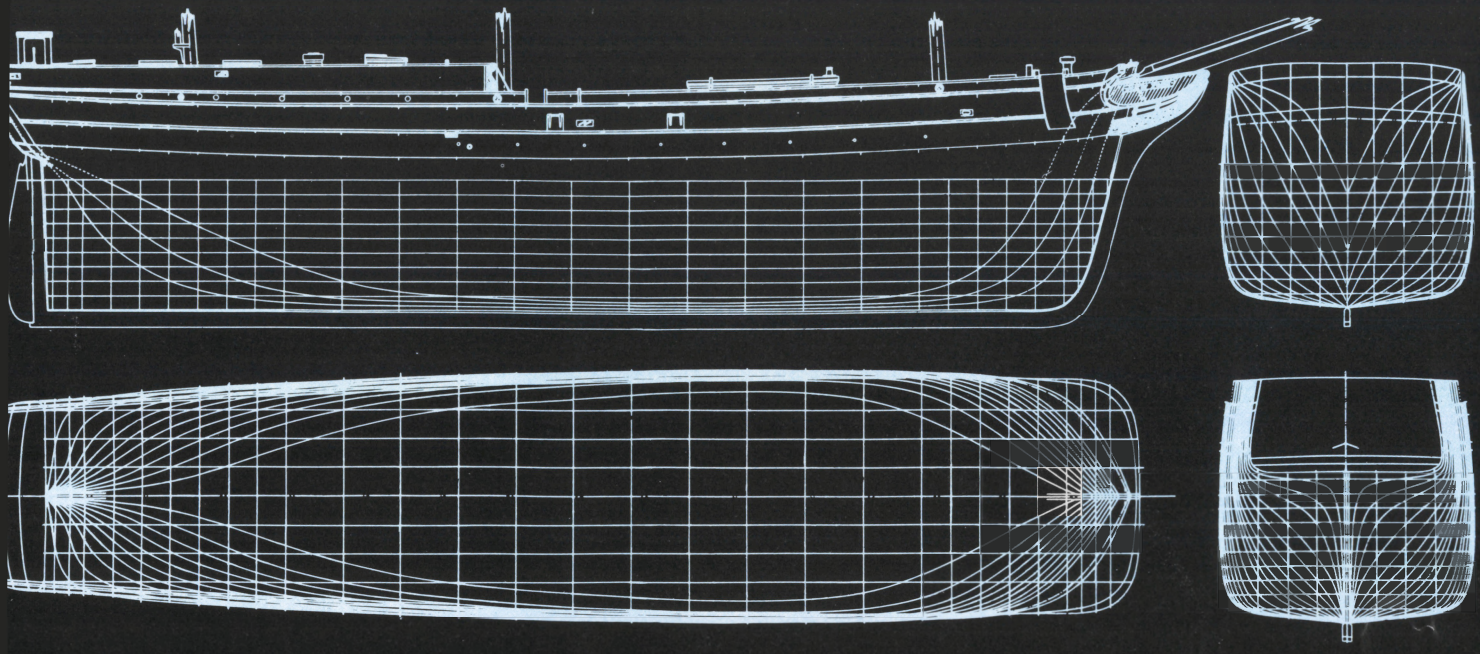
The next generation is represented by the clipper *Sea Witch (bottom right)*, which was even longer than the packet ships. And, like the smaller Baltimore clippers, she boasted a sharp bow and a fine stern. But the *Sea Witch* was more than the sum of her evolutionary parts. She amounted to a quantum leap in ship design and became the prototype for a generation of clippers.



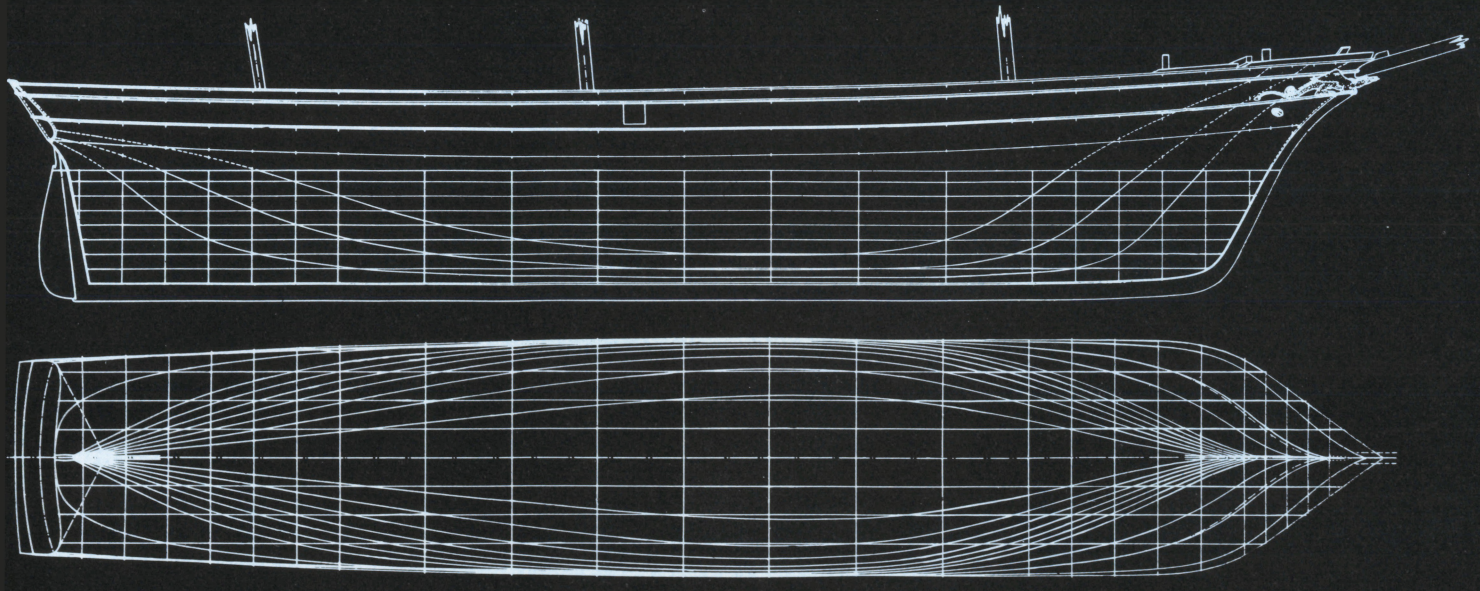
*Built at Newbury, Massachusetts, in the fall of 1773, the 178-ton Codrington measured 77 feet 1 inch in length and 23 feet 7 inches in breadth, and had a depth of 12 feet 6 inches. A short, deep, capacious vessel, the Codrington had two complete decks, and additional platforms in her hold for a wide assortment of merchandise.*



*Although launched as a privateer in Baltimore during the War of 1812, the 225-ton Lynx was taken by the British before she could begin her predatory career. She was 97 feet long and 24 feet 4 inches wide, and had a depth of 10 feet 8 inches. Schooner-rigged, the Lynx carried six guns and a crew of 40. When she was properly trimmed, her keel sloped down nearly four feet from her bow to her stern.*



*A handsome packet built by William Webb in 1839, the 862-ton New York measured 152 feet 6 inches in length and 35 feet 4 inches in breadth, with a depth of 22 feet. Wall-sided and flat-bottomed, in her time she was the largest packet of the famous Black Ball Line. She had a moderately sharp bow with a slightly angled stem; above her straight keel, the hull of the New York curved steeply inward near her sternpost and ended with a rudder that was almost vertical.*



*The Sea Witch, John Griffiths' record-breaking clipper, measured 170 feet 3 inches in length and 33 feet 11 inches in breadth, with a 19-foot depth. The 907-ton ship had a jutting stem and a razor-sharp bow that flared out in concave curves. Capable of packing 1,100 tons of cargo, the ship's hull was full-bodied amidships, with a rounded turn of the bilge. Aft of her mizzenmast, the clipper's hull was tapered with a graceful convex curve and ended with an angled sternpost.*

tion as a tough and efficient officer—and a courageous one. The *Britannia's* Captain Charles Marshall later recalled how, in a North Atlantic gale, Waterman had dived overboard (presumably after fastening a life line to himself) to save a sailor who had fallen from aloft. Nor did it escape Captain Marshall's attention that the next day Waterman thrashed the same man for malingering. When Captain Marshall earned enough money to buy control of his own fleet of ships, one of his first moves was to promote Waterman to captain.

Waterman's first command was the packet *South America,* which he began driving back and forth across the Atlantic in 1833. His second ship was the *Natchez,* in which he made his record-breaking passage from Macao to New York. On that voyage Waterman had transformed the old cotton packet into a crack China racer. Using the ship's collection of spare spars for studding-sail poles, and throwing aloft every stitch of canvas he could dig out of the vessel's sail locker, Waterman had lighted a fire under the *Natchez'* tail, until she practically flew across the seas to her home port.

Now, aboard the *Sea Witch,* Waterman was determined to break the *Natchez'* record. The *Sea Witch,* with a hand-picked crew aboard, sailed from New York on December 23, 1846. Through the winter gales of the Atlantic and against the monsoon winds, Waterman pushed his new clipper hard, testing her ability to best the elements. Despite adverse weather during the whole passage, the *Sea Witch* reached China in 104 days, two days longer than the *Rainbow* took on her maiden voyage. Unlike the *Rainbow,* however, the new clipper came through with her top-hamper unscathed. And with favorable winds, she ran her cargo of tea back to New York in only 81 days. Less than two weeks later, Waterman and the *Sea Witch* were off again, this time for Hong Kong. The familiar struggle against the weather held her time to 105 days. Waterman raced the *Sea Witch* home in 77 days, breaking the record he had set in the *Natchez* five years earlier. But both of these creditable passages were about to be overshadowed by the *Sea Witch's* third voyage, the most remarkable China-to-New York run of the entire clipper-ship era.

To reach China on this trip, Waterman did not follow the usual route east around Africa's Cape of Good Hope and across the Indian Ocean. Instead, after raising anchor in New York Harbor on April 27, 1848, he took the *Sea Witch* west around Cape Horn at the foot of South America to deliver a cargo to Valparaiso, Chile, before crossing the Pacific for China. Altogether, the passage took 121 sailing days. Still, the *Sea Witch* was anchored in the harbor at Hong Kong that December, with several weeks to spare before the year's new tea pickings would be ready for shipment. In the first days of the new year, the clipper began to take on her cargo. At noon on January 9, 1849, the *Sea Witch's* hatches were sealed for the voyage, and Waterman bade Hong Kong good-by. At 7:30 that evening, with a fine breeze blowing out of the northeast, Captain Bob discharged the Chinese harbor pilot, and the *Sea Witch* set sail on a passage that would make history.

On this homeward trip Waterman would take the usual westerly course around Africa. Her sails straining above her long hull, her rigging thrumming and her masts groaning, the *Sea Witch* streaked across the

*The house flags of shipping firms in New York—home port for most American clippers—are identified on this 19th Century broadside. The pennants of some firms—especially A. A. Low & Bro. (fourth row, fifth from left) and Howland & Aspinwall, whose name is spelled incorrectly here (fifth row, third from left)—were almost as well known in Hong Kong as they were in Brooklyn.*

China Sea. The very first day she made 202 miles, traveling at a rate most sailing vessels could never hope to achieve. With Faustian confidence, Waterman ordered up the royals and studding sails. And, as if by agreement with the gods of the oceans, the *Sea Witch* began to race like a demon. Under a cloud of kites she logged 272 miles the second day, and on the third day she ran 262 miles.

This was Waterman at his best, keeping every shred of canvas on the *Sea Witch*, using the least slant of breeze and drift of current, clawing upwind through each gust. He had an intuitive feel for a ship under way, sensing when she was in perfect equilibrium with the wind and sea. He also had an almost eerie knack of guessing where the winds might be, and using them. For her part, the *Sea Witch* proved she could maintain her steady ocean-eating pace in almost any weather. On January 16, eight days out, First Mate George Fraser, who kept the *Sea Witch's* log, observed, "Light baffling airs through the day." Still, Fraser reported, the clipper eked out 65 miles.

Delicately picking his way through the myriad uncharted reefs of the China Sea, constantly on the lookout for Chinese and Malay pirates, Waterman made it to the Sunda Strait—the passage between the islands of Sumatra and Java—in only nine days. On January 17, as the *Sea Witch* slipped into the narrow strait, Malayan sampans shot out from the shore. Approaching the American ship, pidgin-speaking Malays offered coconuts and yams, ducks and chickens, mats and shells, monkeys and caged sparrows to the clipper men. As a precaution, Waterman armed himself and his officers, and ordered a close watch on the visitors. The Sunda Strait was notorious for foul play.

The *Sea Witch* was in luck—no pirates. She worked her way carefully through the reef-strewn waters, coming so close to the shore at times that the men could hear the parrots squawking in the jungle. On the night of January 17, a series of gusty squalls swept through the passage. Waterman anchored in the lee of an island. By dawn, Fraser noted, "the weather looking better," the anchor came up again. The *Sea Witch* skirted a rocky outcropping at the end of the strait, known to sailors as "Thwart-the-Way Island," and emerged into the dark-blue waters of the Indian Ocean. The looming heights of Java Head, redolent of sandalwood, receded astern. A fresh breeze sprang up, and Waterman set all sail.

The *Sea Witch* was scarcely out on the Indian Ocean when the wind died again. Still Waterman kept her moving through calms and light airs for a fitful week. Finally, on January 25, a succession of sharp rain squalls promised better weather, and the next day Fraser could record "strong breezes." The *Sea Witch* put her shoulder down and surged ahead. Now she began to fly. That day she ran 276 miles. On January 27 she made 292 miles, the next day 281 miles and the next, 282 miles. In his entry for February 1, Fraser wrote "strong trades" with a bold flourish of his pen, before recording a day's passage of 300 miles.

Within a fortnight the appearance of albatrosses and Cape pigeons announced the foot of the African continent. And at 3 a.m. on February 16, Fraser noted, "Cape Good Hope bore north true," as Waterman cut the corner. With the west coast of Africa just over the horizon, the *Sea Witch* picked up the southeast trades and went rushing northward. That

# An exotic trade's exquisite prizes

When America's venturesome clipper captains returned from a voyage to China, tea drinkers across the country rushed to pay top prices for the delicately flavored new pickings. But the clippers also brought a trove of less ephemeral temptations: Tucked among the tea chests were handcrafted Oriental wares coveted by almost every householder of the day.

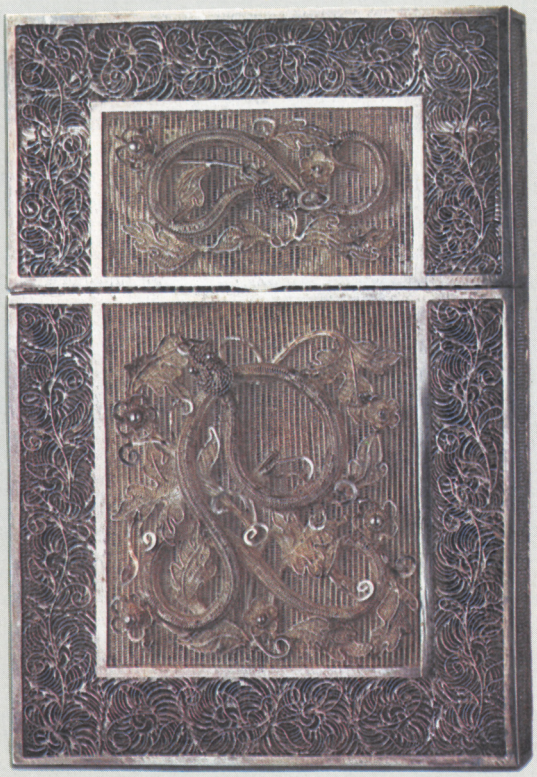
The ravenous hunger for chinoiserie could be traced to the year 1785, when a pioneer of America's commerce with China, the *Empress of China*, arrived in New York with her hold weighted with porcelain as ballast. That casual cargo was immediately snapped up by the American public, and by the mid-19th Century Chinese artisans were supplying the United States market with a veritable cornucopia of merchandise—silks, porcelains, paintings, fans, silver dishes, ornate ivory *objets d'art*, and furnishings of polished wood and lacquer ware.

Westerners were particularly intrigued by the ivory carvers' skill. "Their mode of working is as much a secret as it was five centuries ago," reported an American merchant in 1844. "Many imagine the carvers have some method of softening the ivory, but I do not believe that. The art handed down from father to son has become perfect." The Chinese silversmith's workmanship was equally renowned. "He can manufacture any article in the most elegant manner or produce a pattern of forks at very short notice," observed one American. "The silver is remarkably fine and the cost of working it a mere song."

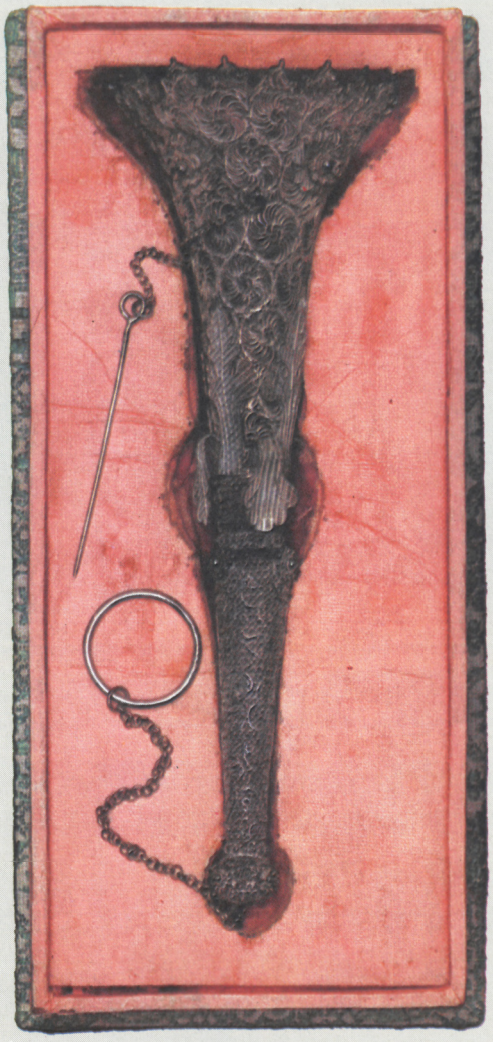
So brisk was the trade that by 1850, in Salem, Massachusetts, as much as one fifth of every household's goods was imported from China. Ladies' fans, a significant item in the trade, were brought in by the tens of thousands.

During the 1860s, as European factories began manufacturing inexpensive porcelains and Chinese craftsmen started producing cheap, gaudy items under the pressure of Western market demand, the traffic in finer goods tapered off. But by that time, China's largely anonymous artisans, with their command of vibrant color and intricate patterning, had left an enduring impression on a culture they would never see.

*A paper fan opens to reveal a watercolor vista of the Whampoa Reach anchorage near Canton, where American ships took on such wares.*



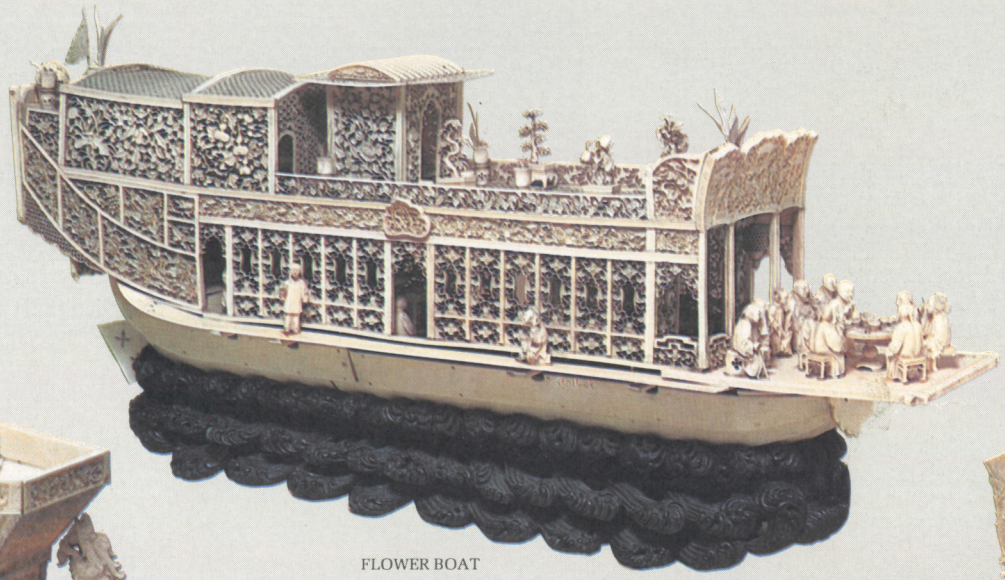
CARDCASE



FLOWER HOLDER

SOUP TUREEN

*Three elaborately decorated containers bespeak the mastery of China's silversmiths. Westerners were astonished by the low prices as well as the beauty of these objects. "It is much cheaper," said an American merchant, "to have a splendid service of plate in China than in any other country."*



FLOWER BOAT

*Ivory objects such as these, carved from elephant tusks that were imported to China from southern Africa, Siam and Burma, were among the most highly prized items of the China trade. Often set in finely worked wooden bases, these feats of craftsmanship inspired one American merchant to assert that "there are no such carvers in the world as the Chinese."*

VASE

DECORATED ELEPHANT TUSK

*Gleaming with a gilded view of the harbor at Macao, this handsome worktable with ivory fittings is one of thousands of lacquered furnishings exported to the United States during the 19th Century. The gilding was brushed on to a surface etched beforehand with a steel point.*

SEWING TABLE

day she made the best run of her entire voyage, an amazing 308 miles. But in less than 48 hours the winds softened again. Waterman pushed on: 73 miles through light airs and overcast skies on February 19, then 158, then 128, 174, 198 and 183. Steadily the *Sea Witch* ran up the South Atlantic, moving surely but all too slowly for Waterman, who realized by this time that he stood a good chance of breaking his own record for the passage from China.

On March 5, Fraser wrote, "Rather more wind today," as the *Sea Witch* covered 220 miles. Then the wind fell off again, but Waterman still scratched out another 183 miles. On March 7 the *Sea Witch* crossed the Equator. A squally night on March 9 brought her into the latitude of the northeast trades. And the next day the clipper was roaring along, everything flying and bound for home.

By March 12 the whole crew talked about New York while they painted the ship so she would make a proper entrance into the harbor. Then, on March 20, a fierce squall struck out of the north-northwest, heeling the *Sea Witch* over hard and, wrote Fraser, "plunging bowsprit under." But the same sharp shape that made the clipper's bow likely to dip beneath the waves in these conditions also gave the *Sea Witch* "weatherliness," an ability to sail closer to the wind than her bluff-bowed predecessors. Waterman kept his course under double-reefed sails. The next day, near Bermuda, the *Sea Witch* was lashed by another storm, this time a northeaster, and Waterman reluctantly ordered triple reefs—and ordered them shaken out the minute the storm had swept past. Plunging through a "horrid head sea" in the wake of the storm, the *Sea Witch* entered the Gulf Stream. Finally the winds moderated; Waterman "set all stun-sails." And on March 25 he brought the *Sea Witch* up to her landfall under the gaze of the lookout at the Sandy Hook semaphore tower, completing the passage from Hong Kong in 74 days 14 hours actual sailing time—a record that was never broken.

The combination of John Griffiths and Robert Waterman was a natural alliance of designer and skipper, remarkable less in the fact of partnership than in the gifts of the partners. A third contribution to the success of the clipper ship was positively providential. While Griffiths and Waterman were launching the clipper era—with an assist from Nat Palmer—the man who set its course was at work in a stuffy office in Washington, D.C. Matthew Fontaine Maury had come to the aid of the clipper by a most unlikely circumstance. A farm boy from Tennessee who had left home to join the United States Navy, he had sailed around the world as a midshipman and risen to the rank of lieutenant when, after a visit home, he had been thrown from the top of a stagecoach. His broken leg had never properly healed, and for the rest of his life he walked with a limp.

The Navy, considering Maury unfit for further sea duty, assigned him in 1842 to its Depot of Charts and Instruments in Washington. In the depot's vault, Lieutenant Maury discovered a collection of thousands of ships' logs, including nearly every one that had been kept since the birth of the United States Navy. The logs had been relegated to the Depot of Charts and Instruments for want of a better place to put them. Dead

storage to the Navy, they represented a treasury of information to Maury, for they held records of weather and sea conditions for every month of the year in all parts of the world. Once refined, this knowledge would constitute an aid to navigation as valuable as any instrument on the chart table or any volume in the bookshelf of a captain's cabin.

The lieutenant and his small staff immediately began organizing and compiling the hundreds of thousands of observations recorded in the logs. Maury also persuaded the Navy to enhance the collection by issuing to all its ships a standardized form requesting specific observations of weather, winds, currents and other hydrological and meteorological information. From the combined observations of the old logs and the new forms, he set about compiling a set of navigational charts to map the highways of the sea as they had never been mapped before.

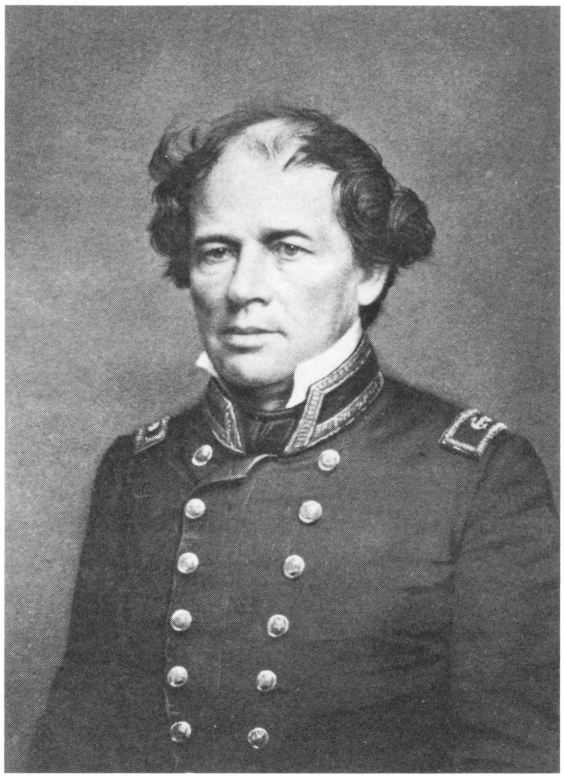
His first area of concentration was the much-traveled passage from northeast America down the Atlantic to Rio de Janeiro. Here Maury made the first of many discoveries that would alter the traditional patterns of navigation and vastly reduce the time it took for a sailing ship to go from one port to another.

To most mariners in the 1840s, the chief obstacle in the run down to Rio was the great bulge of the South American continent at Cape São Roque, reaching out into the Atlantic nearly to the longitude of the British Isles. A skipper normally set a course out across the Atlantic, "running down his easting," as he called it, so as to weather Cape São Roque before turning south for Rio. But Maury, studying the countless observations in the Navy's logs, found that this was the wrong way to Rio, for two important reasons.

One reason was already known by most skippers, but they were unable to figure out what to do about it. The northeasterly trade winds of the North Atlantic and the southeasterly trades below the Equator were separated by bands of calm weather—the so-called doldrums. Most navigators resigned themselves to drifting through the doldrums, moving at a snail's pace for days and sometimes for weeks, until they had gone far enough south to pick up the South Atlantic trade winds. What Maury discovered from his study of the logs was that these bands of calm varied greatly in width: They were much narrower in some parts of the Atlantic than in others. Moreover, the width of the bands could also change according to the season of the year. "The calm belts of the sea," he wrote, "like mountains on the land, stand mightily in the way of the voyager, but, like the mountains on the land, they have their passes and their gaps." Maury thereupon charted the shortest passes through the equatorial doldrums of the Atlantic.

This contribution to navigation was doubly important because of yet another of Maury's discoveries. Mariners' tradition—and some guides to navigation—had it that, because of the prevailing winds off Cape São Roque, a strong current set in toward the land. Once a ship was trapped inside this current, warned the guides, it could lose days before it was able to work its way out.

The case was quite the contrary, as Maury discovered in the logs of the few skippers who had gone in close to Cape São Roque: Most had found no adverse current at all. Indeed, he wrote, "a few of them report the



*For the decades he spent mapping global winds and currents on the basis of thousands of ships' logs, Matthew Fontaine Maury received honors from almost 50 learned societies, medals from European royalty, and the gratitude of clipper captains. But despite all his labors, Maury never rose above the rank of lieutenant in the United States Navy.*

current in their favor." Maury also discovered that there was a narrow band of westerly winds near the coast. The favorable current and winds could actually help the captain make better time, so long as he held his ship close to the hitherto dreaded cape. This, Maury declared, was the "fair way to Rio."

In 1847 Maury published his discoveries in a volume titled *Wind and Current Charts*. On printed charts of the Atlantic, Maury superimposed a sprinkling of symbols that indicated the probable winds that a ship was likely to encounter. Accompanying this graphic correlation of his observations were recommendations on how to use those winds to the best advantage.

Veteran merchant skippers did not at first take kindly to such brash advice from a landbound naval officer who had seen less than a decade of sea duty. Then, in 1848, a merchant captain by the name of Jackson put Maury's charts to the test. Sailing out of Baltimore in the bark *W.H.D.C. Wright*, Captain Jackson ran from the Virginia capes to Rio in 38 days; the normal time was 55 days. Following the same charts, Jackson came home in 37 days. He had made the round trip in 35 fewer days than he usually required. The news took even less time to spread through the counting rooms of Baltimore, New York and Boston, aided by an editorial in the Baltimore *American*. Overnight, every shipowner and skipper wanted to get his hands on those newfangled charts.

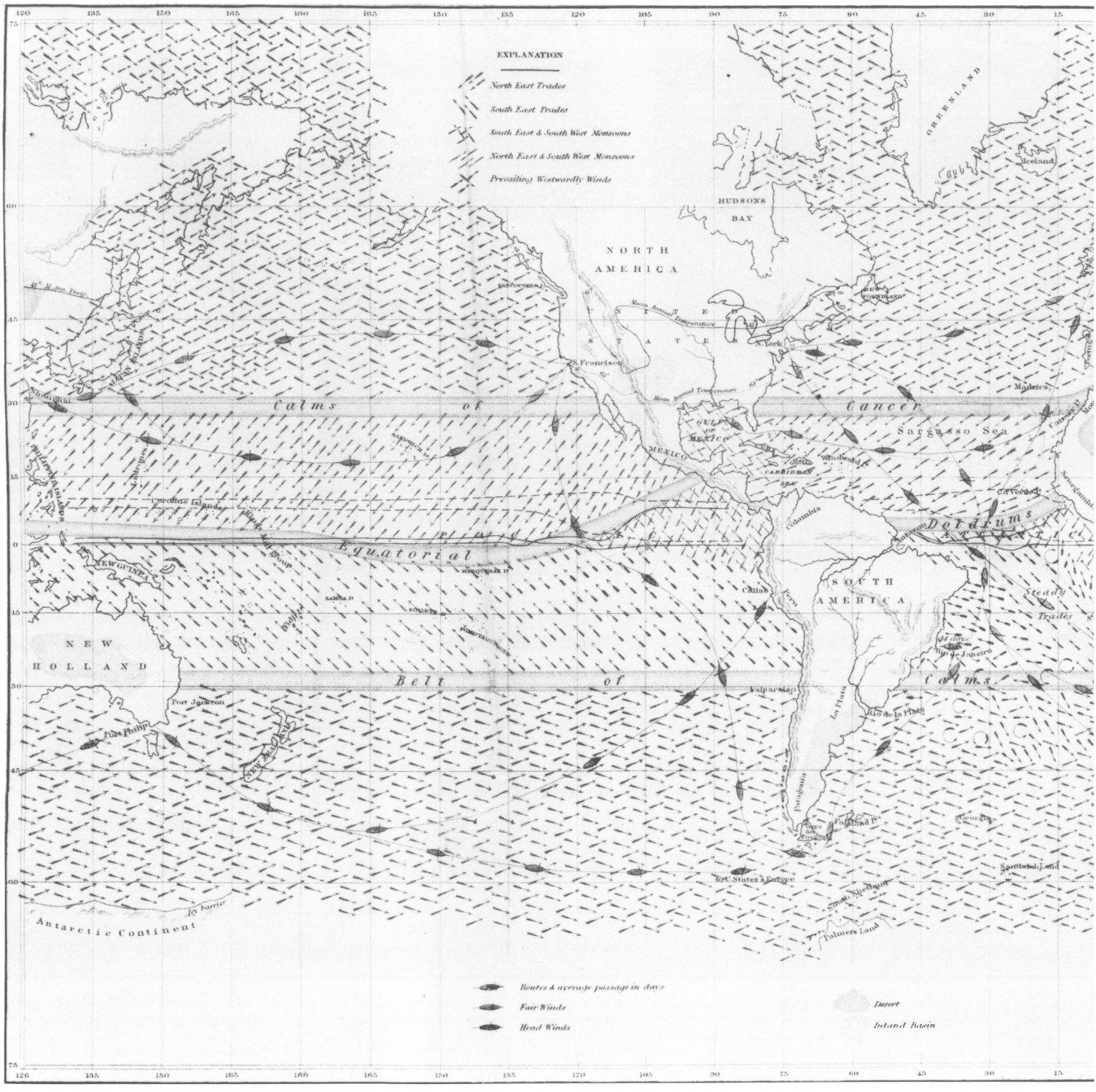
Maury was ready for them with an offer that was so attractive they could hardly refuse it. He had prepared a 10-page *Abstract Log for the Use of American Navigators;* it distilled the information of his *Wind and Current Charts*, and accompanying it were 12 blank pages for the navigator to fill in during his next voyage. On receipt of this information, Maury would forward to the captain the latest, updated *Wind and Current Charts* free of charge.

By July 1848, only four months after Captain Jackson's voyage to Rio, Maury had received the abstract logs of four more ships on that run; they had saved an average of 10 days. By the end of the summer the reports were flowing in, and Maury and his assistants were busy trying to keep up with them.

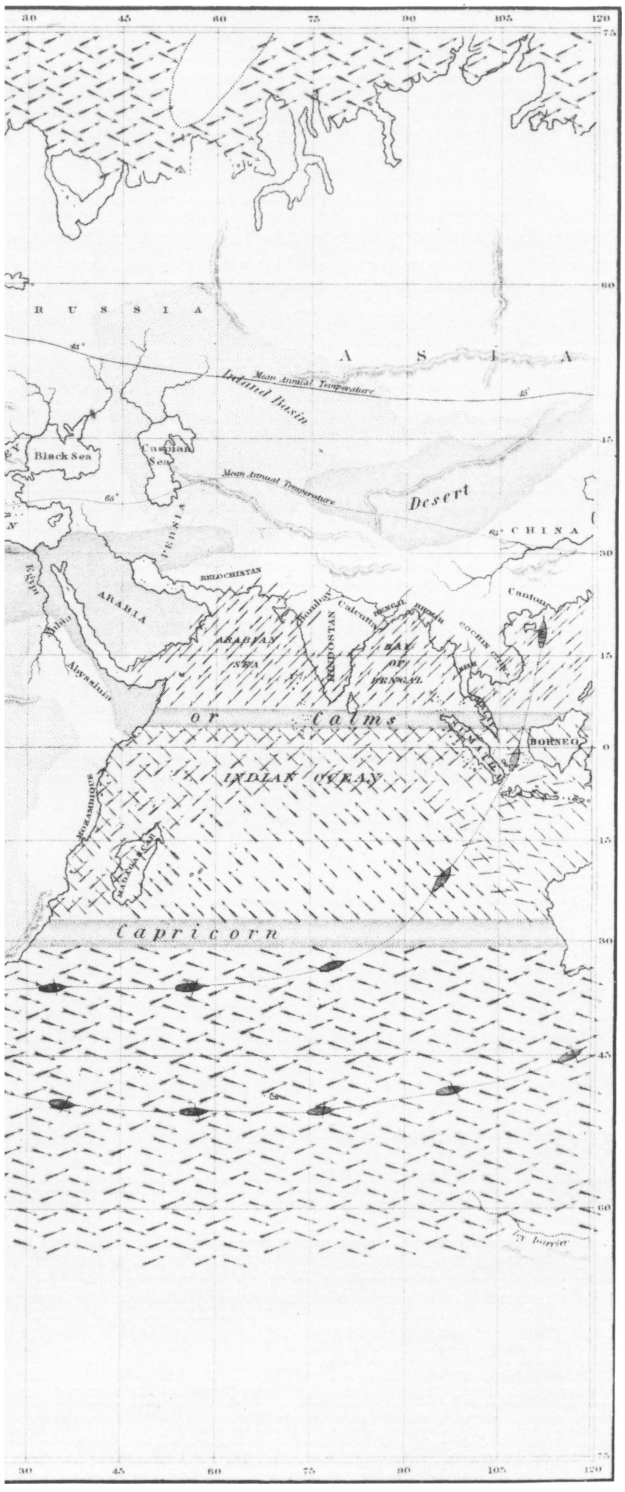
Eventually Maury issued charts for all the world's oceans. These were supplemented by general sailing directions for the major trade routes. Later series offered more specialized information on the trade winds, monsoons, water-surface temperatures, storms, currents and even the distribution of whales.

The charts were steadily revised and improved as new reports poured in. By the end of 1851, Maury had heard from more than 1,000 captains. By 1854 he had about one million observations on the prevailing directions and velocities of the oceans' winds. He had received 380,284 observations on the Atlantic Gulf Stream alone. After collating all this new material, Maury expanded his charts by publishing what he called *Explanations and Sailing Directions*, which highlighted his discoveries and offered more general advice for long ocean passages.

By 1854 Maury had completed a definitive work that he titled *The Physical Geography of the Sea*. Combined with his earlier *Wind and Current Charts* and his *Sailing Directions*, Maury's *Geography* became




*This chart by Matthew Fontaine Maury indicates the directions of prevailing winds throughout the world. Long-distance routes that would best exploit the weather patterns are traced on the chart by series of schematic ships—the last one on each passage bearing a notation of the average time of the voyage.*




the essential guidebook for the mid-19th Century navigator. Besides guiding his "noble-hearted mariners," as he called his correspondents, on the fair way to various ports, Maury offered such intriguing and useful general information as:

☐ The Mozambique Current, flowing southeastward in the South Pacific and Indian Oceans, is 1,600 miles wide, nearly as broad as the entire length of the Atlantic Gulf Stream.

☐ The tides in the Atlantic are higher than those in the Pacific, with consequent differences in tidal-current velocity in some regions.

☐ The Atlantic is the stormiest sea in the world; the Pacific—true to its name—the most tranquil.

☐ Winds have little influence upon the major currents of the sea. The Gulf Stream, for example, runs much of its course right in the "wind's eye." So does the Japan Current in the Pacific.

☐ The Gulf Stream is "roof-shaped," i.e., slightly higher in the middle, with its surface waters flowing off to either side. The "runoff," as Maury called the flow, is too shallow to affect the deep hull of a ship. But the navigator is able to determine whether he is south or north of the stream's center by lowering a boat on a line; it will drift off to one side or the other with the flow.

☐ The southeast trade winds are stronger than the northeast trades because they predominate in the Southern Hemisphere, which is cooler than the Northern Hemisphere. Similarly, all trade winds are stronger during their hemispheric winter than in summer.

Maury's charts and *Sailing Directions* cut days and weeks off a vessel's passage. American ships, with their navigators using Maury's charts, began to circle the globe in a third less time than before. By 1851 the average merchant ship's time around the Horn to California was pared by more than 40 days, and clipper captains did even better. Some captains wrote Maury that, by avoiding the storm areas indicated on his charts, they had completed their voyages without reefing topsails more than once or twice.

Already many navigators were referring to Maury as the "Pathfinder of the Seas." Captain Phinney of the clipper *Gertrude*, sending in his contribution to what he called Maury's "great and glorious task," acknowledged that "until I took up your work I had been traversing the ocean blindfolded."

So, in a sense, the American clipper-ship era was designed by men like John Griffiths and Nat Palmer, ushered on stage by captains like Robert Waterman, and guided to greatness by Matthew Fontaine Maury. But it received its most powerful impetus from a man who had never seen a clipper. In January 1848 a carpenter named James Marshall, cleaning out a sluice at Sutter's Mill in California, noticed some nuggets glittering in the sand. He picked them up to examine them, and then beat one of them between two stones. The nugget did not shatter, as iron pyrites—fool's gold—would have, but obligingly changed shape when pounded. Marshall's pulse quickened, and so did that of the whole nation when news of his discovery got out. In California, a remote territory that could be reached from the populous Eastern United States only by a long trek or a longer voyage, James Marshall had found gold.

Chapter 2

# A golden lure for clipper builders

*The ribs of a new ship rise above a jumble of timber at Donald McKay's East Boston shipyard, where 32 clippers were built between 1850 and 1869.*

During the spring of 1849, one of the strangest mooring procedures in the history of seafaring became a customary occurrence in the inner harbor of San Francisco Bay. It was a sight that would have astounded even the saltiest dock hand in any saner port. First, a ship would appear at the Golden Gate, the narrow entrance to the bay; usually it would be a bark or packet from New York or Boston, weatherworn and bedraggled from her arduous journey around Cape Horn, but normal enough in her actions as she approached. Gliding past the little island of Alcatraz and hooking around to the west, the vessel would steer directly for the crowded anchorage off North Beach at the foot of Telegraph Hill.

At this point the ship's behavior became decidedly bizarre. Ordinarily a captain would bring his ship into an anchorage under reduced sail, let go anchor and send the crew aloft to furl the sails neatly on their yards before the passengers, if any, were rowed ashore. But, as likely as not, a ship fetching up in San Francisco in 1849 would bear down on the harbor under full sail, drop anchor, let go her braces and sheets, and immediately begin debouching passengers over her gunwales as if she were expected to explode at any moment.

And an odd lot of passengers they were. Some carried paper parasols as if they were going to the Sudan, while others were bundled in furs and arctic gear. Many struggled to off-load a variety of exotic equipment, ranging from oddly shaped picks and shovels to cumbersome machines that might have been lifted from a patent officer's nightmare. Still others, unable to find a boat, dived into the bay to swim ashore. Frequently the ship's crew joined in the stampede, and in the space of a few minutes the captain was standing on the quarter-deck of an otherwise abandoned ship, her sails fluttering loosely in the breeze and only the harbor pilot left aboard to console him.

For all their comic-opera quality, such scenes were entirely natural at that time and in that place. This was gold-rush San Francisco, the seaside recipient of a motley army of fortune seekers who knew almost nothing of the California wilderness and still less of the techniques of extracting gold from the earth, but who were propelled by one thrilling conviction—that they were going to get very, very rich.

Although the first reports of a gold strike in the foothills of the Sierra Nevada had been greeted with healthy skepticism in the East, the evidence soon became undeniable. In December 1848 President James Polk had officially recognized the magnitude of the discovery by announcing that "the accounts of the abundance of gold in that territory are of such an extraordinary character as would scarcely command belief were they not corroborated by authentic reports." At about that same time, a small chest containing some $3,000 worth of nuggets and flakes from the California gold fields was put on view at the War Office in Washington. Each day a crowd gathered before the display, mesmerized by its promise of easy wealth. Meanwhile, an excitement verging on delirium spread throughout the country. From the hardscrabble farms of New England to the coal mines of Pennsylvania, a vast legion of men resolved to head at once for the far side of the continent to share in the harvest of riches.

**THE WAY THEY GO TO CALIFORNIA.**

*Forty-niners use every conveyance possible—and some that are not—as they set out for California in this contemporary cartoon of the gold rush. Clipper ships, although they gave passage to many would-be prospectors, actually did a greater business in freight, hauling eagerly awaited supplies to the West Coast at a time when no large-scale overland transport existed.*

Virtually every vessel on the East Coast that showed the slightest seagoing capability was pressed into service to tote the adventurers. In the period from April 1847 to April 1848, a total of only 13 vessels from Atlantic ports had called at San Francisco—then a slumbrous town with barely a thousand inhabitants; in 1849 no fewer than 775 vessels from the East Coast reached the new Golconda. Only a dozen or so clippers were then in existence, and most of these were busy running between China and New York. The sole clipper to join the 1849 rush was the *Memnon,* which easily set the record for the passage from New York, arriving in San Francisco on August 28, 1849, after 122 days at sea. Prior to this sprint, 200 days was considered a respectable time for the 15,000-mile voyage around Cape Horn.

Merchants back East quickly realized that there was a great deal of money to be made by shipping freight as well as people to California. The population of San Francisco was growing at a phenomenal rate—it would pass the 20,000 mark by the end of the year—and prices were out of control. A five-dollar barrel of flour sold for $50. A four-month-old penny newspaper from back East sold for one dollar; so did one egg. A pack of cards cost five dollars. Clearly, a ship that could make three voyages while the competition made two would be a money spinner.

*Combining a dreamer's vision with an engineer's practicality, Donald McKay designed 12 of the 13 clippers that achieved runs of 400 miles or more in one day. Yet he was never complacent: "I saw something in each ship which I desired to improve upon," he said.*

As soon as they could manage it, other clipper owners diverted their vessels from the China trade and sent them racing around the Horn. All of them were out to better the *Memnon's* time. On May 6, 1850, the A. A. Low & Bro. clipper ship *Samuel Russell* arrived in San Francisco 109 days after leaving New York. She was loaded to her scuppers with 1,200 tons of merchandise and flour that earned a stupendous profit. Two and a half months later, the *Sea Witch,* now skippered by Captain Robert Waterman's former first mate, George Fraser, came surging up to the Golden Gate in the amazing time of 97 days from New York, despite having encountered violent storms off Cape Horn. Her cargo, which cost $84,626 in New York, was worth $275,000 in San Francisco, nearly four times the clipper's construction cost.

News of these passages had a predictable effect. In the autumn of 1850 the shipyards of New York and New England, already busy building clippers for the China trade, fairly exploded with this new impetus. A long row of clipper-ship skeletons rose on the shores of New York's East River, where as many as 10,000 men worked in the yards from dawn to dusk. The sounds of sawing and hammering echoed across the river, and the air for blocks around was filled with the smells of wood shavings and pitch. The clipper-ship era was under way in earnest.

During the next 10 years, hundreds of clippers—most of them following Matthew Fontaine Maury's recommended route—would run their easting down to Cape São Roque, turn southwestward and thrash through the Cape Horn gales in sail-thundering voyages such as had never been imagined before. This passage called for a new type of clipper ship, larger than the China clippers so that they could carry more merchandise, and stouter so that they could withstand the violent weather off Cape Horn.

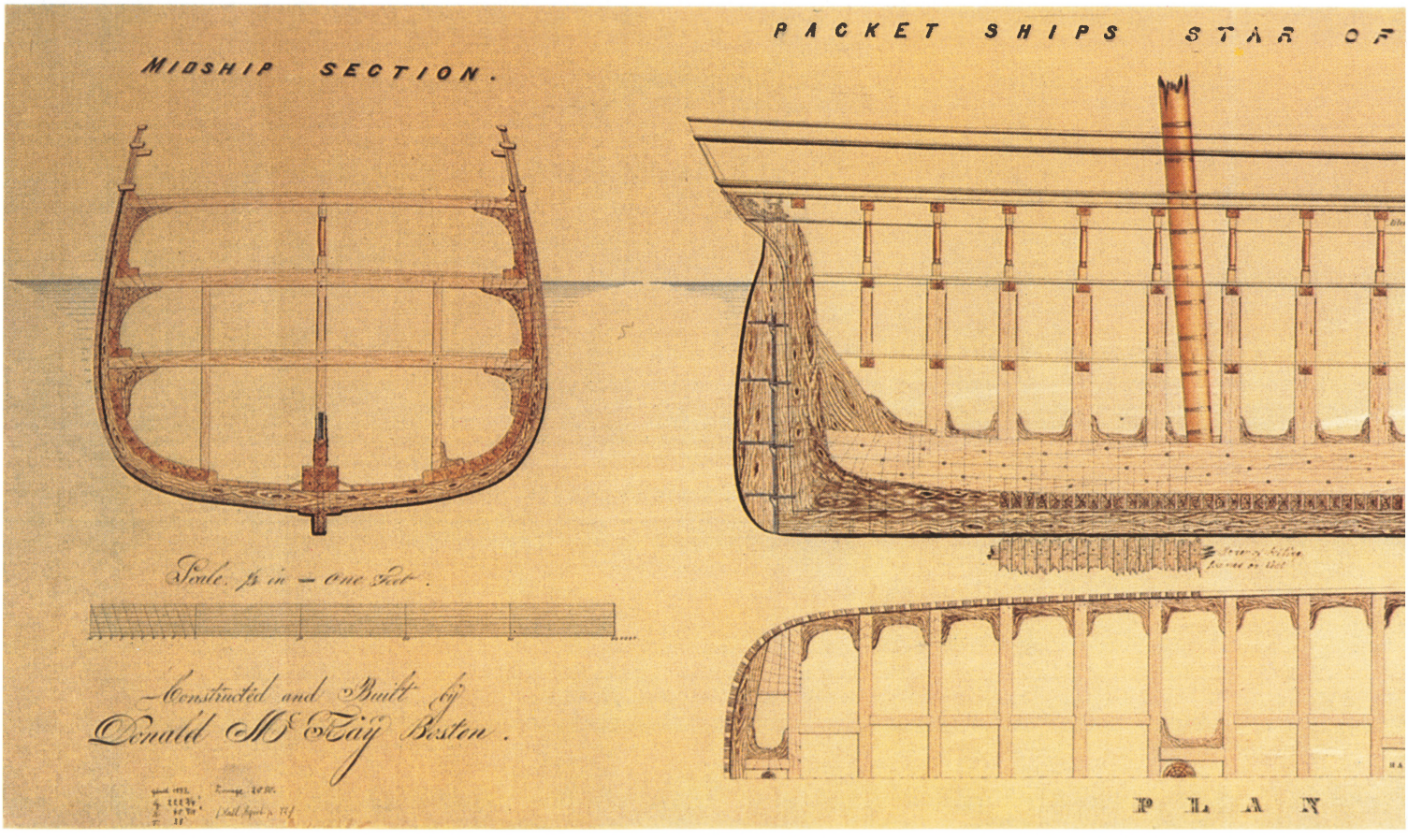
To the public at large, the clippers built for the California run were the stuff of legend—partly because they accepted the worst punishment nature could throw at them and almost insolently turned it into speed; partly because they were associated with the greatest adventure the new nation had ever known; and also, more fundamentally, because they represented an astonishing achievement of the shipbuilder's art. The demands of their design were such that the men who constructed these vessels won the status of popular heroes. And one member of their ranks—Donald McKay—was held in awe even by the shipbuilders themselves. More than any other builder, McKay brought the sharp-bowed, tall-masted sailing ship to perfection.

Like the Tennessean Matthew Fontaine Maury, McKay was farm-bred; in his case, however, the sea had always been a familiar presence. Growing up with 15 brothers and sisters on a marshland farm in Shelburne, Nova Scotia, he breathed salt air and woke to the cry of gulls. With the aid of his younger brother Lauchlan, he built a sailing dinghy and used it for boyhood explorations of Shelburne's bays and the nearby Jordan River. Then, in 1826, 16-year-old Donald rode a coastal schooner from Halifax to New York and got a job as a laborer in an East River shipyard run by Isaac Webb.

Webb has been called the "Father of Shipbuilders" because so many leaders of the industry learned their trade under his tutelage. He was

quick to take notice of the young immigrant from Nova Scotia: Right off, McKay showed ability with his tools and a willingness to work from dawn to dusk to learn the shipbuilder's craft. Within a few months McKay and Isaac Webb signed an indenture, apprenticing Donald to Webb "to learn the art, trade and mystery of a ship-carpenter." In return for his lessons, Donald promised his master that he would faithfully serve him, "his secrets keep, his lawful commands everywhere readily obey." The agreement covered virtually all of the young apprentice's waking hours—in fact, it stipulated that "he shall not absent himself day nor night from his master's service without his leave." Nor would he "haunt ale-houses, taverns, dance-houses or playhouses." Besides his tutelage, young McKay would receive $2.50 a week, plus $40 a year "in lieu of meat, drink, washing, lodging, clothing, and other necessaries." The apprenticeship was to last four and a half years.

In fact, it lasted a bit less. After four years of honoring his contract to the letter—by day hefting massive live-oak timbers and straining in the saw pit at one end of a two-handled crosscut saw, by night sticking close to a bachelor boardinghouse aptly nicknamed the "Weary Wanderers' Hotel"—Donald McKay was ready for something new. He had mastered his trade so well that a rival shipbuilder, Jacob Bell, offered him a job as a full-fledged shipwright. He petitioned his master, and Isaac Webb generously released him from his nearly completed apprenticeship.



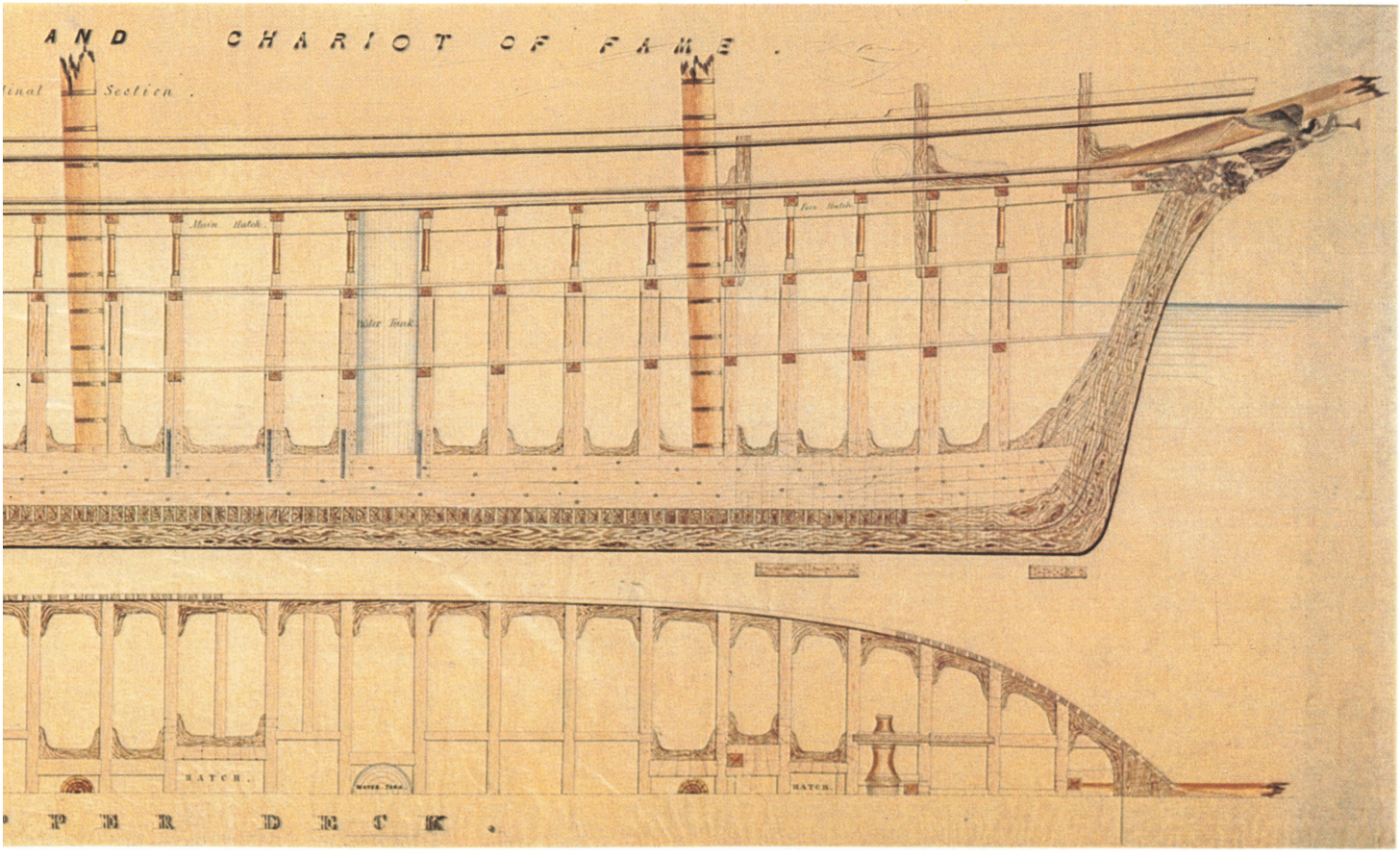
The very next year good fortune favored McKay again: He fell in love with a young lady named Albenia Boole. She was the eldest daughter of John Boole, a successful New York shipbuilder; two of her brothers were shipbuilders as well. Brought up in such a family, Albenia learned to draft and lay off plans as expertly as her brothers. She also had an excellent education, something that Donald had never received.

They were married in 1833. Albenia brought a comfortable dowry to the marriage, and the newlyweds purchased a small house in Manhattan's choice residential area of East Broadway. McKay continued to work for Jacob Bell at the shipyard of Brown & Bell. On Sundays, his one day off, and far into the night on weekdays, he and Albenia sat together in their small parlor while she taught him algebra and trigonometry and filled the many other gaps in his knowledge.

Nearly as important as his marriage was the friendship McKay struck up in the 1830s with John Griffiths, then a draftsman at the nearby Smith & Dimon yard. Long before Griffiths started the shipbuilding revolution with his *Rainbow* and *Sea Witch*, he and McKay had often sat for hours at a drafting board, discussing modifications that might boost the speed of a ship under sail.

All the while, McKay's reputation as a shipwright was growing, and in 1839 he was chosen from a field of nearly a thousand men to become a foreman at the Brooklyn Navy Yard. This triumph, however, soon turned

*Sketched in his own hand, Donald McKay's plans for the twin ships Star of Empire and Chariot of Fame demonstrate his skill in designing for large storage capacity as well as for speed. Although they retained the sleek lines of McKay's more extreme clippers, these three-decked vessels, which were launched in 1853, could carry more cargo in proportion to their registered tonnage than the fullest earlier designs.*



sour. The coincidence of a financial depression and a large influx of immigrants from Europe stirred a ground swell of prejudice in New York against those who were not native-born Americans. The yard hands at the Navy yard refused to work for an immigrant from Nova Scotia. McKay gave up the job and moved to New England, finding employment in Newburyport, Massachusetts, as foreman of a modest-sized shipyard. Once more his gifts were quickly recognized: In 1841 he was offered a partnership by a local shipbuilder named William Currier.

Three years later, after building a series of fine packet ships, McKay was approached by a wealthy Boston merchant named Enoch Train, who offered to set him up with a yard of his own if he would move to Boston. Thus, at the age of 34, Donald McKay was able to test the ideas he and Griffiths had discussed and shaped a decade earlier in New York City.

The first clipper he built in his new shipyard at the foot of Border Street in East Boston was the *Stag Hound,* an extremely narrow vessel that, at the time of her launch in 1850, was the largest merchant ship on the seas. Commissioned by two Boston merchants, she paid for her construction cost in one voyage to California and the Orient, and immediately put McKay in the forefront of clipper builders.

At the first intimations of success, McKay had sent for his wife and children, who had remained behind in Newburyport when he took this new job; he also summoned five of his brothers to come down from Nova Scotia and help him design and build ships. The yard soon seethed with activity. Sawdust, carried by gusts off the harbor, swept across the grounds in clouds. Planking creaked as it was made fast to a vessel's ribs; lumber clattered on the decks; and a steam-powered derrick clanked and hissed as it lifted the heaviest timbers and masts. In other New England yards, timbers were moved about by hand, and all workers left whatever they were doing to help heft a big log into place. McKay's use of a steam hoist, an idea he had brought with him from New York, made this interruption unneccessary, dramatically boosting the shipyard's efficiency. Another McKay innovation was a steam saw that replaced the two-man pit saw. The steam saw saved hours on each job, spared men for other tasks and was more versatile than its man-powered predecessor.

McKay, a curly-haired, brawny man with the brow of a poet and the domineering eye of a bantam rooster, seemed to be everywhere at once—making sure the live oak for a ship's beams had been mature when cut, and had little sap left in it; measuring the impregnation of metallic salts in which the wood had been soaked to guard against dry rot; checking to be sure that the wood had been properly seasoned by drying in the sun; marking a frame with chalk for a sharper curve or a tighter fit; gauging the camber of a newly laid deck to see that it would drain but not be dangerously steep when wet; and supervising the work in hundreds of other ways. The ultimate perfectionist, McKay proclaimed "Excelsior" as the motto for everyone in his yard. "I never yet built a vessel," he claimed, "that came up to my own ideal."

McKay often referred to himself as merely "a mechanic," but he was a great deal more than that: He was, in fact, a brilliant synthesizer. Not an innovative designer himself, he willingly gave credit to men such as John Griffiths for the sharp bow, narrower midships and full stern, and

Nat Palmer for the flatter hull. What McKay did was to take all these improvements in ship design and use them as no one else had.

It was typical of him that, while he was the first shipbuilder in New England to use the newfangled steam hoisting engine and the steam saw, he also employed such venerable tricks as filling narrow tunnels in the keelson with salt pickle to preserve the wood, a technique that had been used in England for years but had rarely been put to work in the United States. McKay simply adopted the finest designs, the newest equipment, the tried and true techniques, and combined them to produce the best clippers ever built.

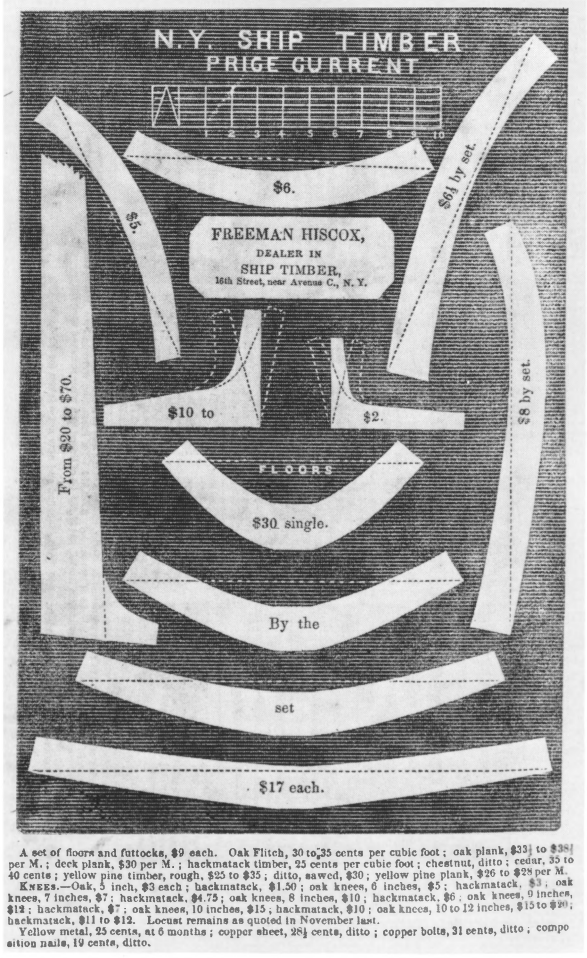
Early in 1851, before the *Stag Hound* had completed her first voyage, McKay's second clipper, the *Flying Cloud,* was already attracting visitors to the yard. Bostonians came down Border Street to watch her take shape; one onlooker who returned again and again was the poet Henry Wadsworth Longfellow, a devoted ship buff. The great ship's proportions were awesome: 1,783 tons, 229 feet in length, 41 feet in width, 21½ feet in depth. She shouldered aside the *Stag Hound* as the largest merchantman yet built, and she was nearly twice the tonnage of the *Sea Witch,* constructed only five years earlier. The *Flying Cloud* had been commissioned by Enoch Train's firm, and she was, said George Francis Train, cousin and partner of Enoch, a "ship destined to make a new era in shipbuilding all over the world."

Considering their enthusiasm, the Trains now did a curious thing. Among the visitors to McKay's yard were some scouts from the New York shipping firm of Grinnell, Minturn & Co. When they reported on this handsome and promising new clipper, Moses Grinnell promptly offered to buy her, unfinished as she was. And the Trains sold her.

The reason, according to George Train, was that he had responded to Grinnell's offer with what he thought was a very high price, $90,000—and Grinnell, to his surprise, answered, "We will take her." A more likely explanation is that the Train firm found itself short of cash and decided to sell the clipper before she was completed. Whatever the explanation, Enoch Train later confessed that there were few things in his life he regretted more than parting with the *Flying Cloud.*

On April 15, 1851, the crowds poured off the ferry at East Boston all morning. Rowboats and sailboats speckled the harbor, and the McKay yard, the Chelsea Bridge and even the nearby masts and rooftops swarmed with people awaiting the launching. When the dogshores holding her in place were knocked away from the tallow-greased skids, Moses Grinnell's new clipper and Donald McKay's masterpiece eased down the ways, picking up speed and making a thumping splash as she backed into the harbor. Her topmasts had not yet been stepped, but flags flew from the stumps of her lower masts, and long pennants snapped and popped in the brisk spring breeze. The white-and-gold angel that was her figurehead bowed to the onlookers as the big clipper dipped, rolled, righted and glided from the shore. Whistles blew, top hats waved and everyone cheered. That faithful follower of the *Flying Cloud's* construction, Henry Wadsworth Longfellow, described such an event in one of his poems: "She starts,—she moves,—she seems to feel / The thrill of

*A timber dealer's advertisement in a magazine for shipbuilders and shipowners reflects the increased standardization of parts as clipper production mushroomed in the mid-1850s. Depending on his pocketbook, a builder had a wide choice of woods—from stout but locally scarce oak to the softer hackmatack, or larch, that grew bountifully all over New England.*




A set of floors and futtocks, $9 each. Oak Flitch, 30 to 35 cents per cubic foot; oak plank, $33 to $38 per M.; deck plank, $30 per M.; hackmatack timber, 25 cents per cubic foot; chestnut, ditto; cedar, 35 to 40 cents; yellow pine timber, rough, $25 to $35; ditto, sawed, $30; yellow pine plank, $26 to $28 per M.
KNEES.—Oak, 5 inch, $3 each; hackmatack, $1.50; oak knees, 6 inches, $5; hackmatack, $3; oak knees, 7 inches, $7; hackmatack, $4.75; oak knees, 8 inches, $10; hackmatack, $6; oak knees, 9 inches, $12; hackmatack, $7; oak knees, 10 inches, $15; hackmatack, $10; oak knees, 10 to 12 inches, $15 to $20; hackmatack, $11 to $12. Locust remains as quoted in November last.
Yellow metal, 25 cents, at 6 months; copper sheet, 28½ cents, ditto; copper bolts, 31 cents, ditto; composition nails, 19 cents, ditto.

life along her keel,/ And, spurning with her foot the ground,/ With one exulting, joyous bound,/ She leaps into the ocean's arms!"

Several days later, with the truck on her mainmast poking 200 feet into the sky—as high as a 20-story building—and riggers fine-tuning her miles of rigging and shrouds, she set out under tow for New York with her newly appointed commander, Josiah Perkins Creesy, aboard. Creesy had grown up in Marblehead, gone to sea in his teens and become a ship's master at 23. Now 37 and a grizzled veteran of the China trade, he was known as "Perk" to his friends—though never to his crew.

For about a month the *Flying Cloud* lay alongside Pier 20 in the East River while her narrow hull was crammed with merchandise for California and while Eleanor Creesy, who always served as her husband's navigator, collected a set of Matthew Maury's *Wind and Current Charts* and *Sailing Directions*. Finally, at 2 p.m. on June 2, 1851, with the white-red-and-blue swallow-tailed flag of Grinnell, Minturn & Co. flying at the masthead, the clipper swung into the river from her pier at the foot of Maiden Lane. She moved slowly through the Narrows, then picked up a fresh afternoon westerly as she approached Sandy Hook.

With a thundering flurry of canvas, her mainsail was backed for a moment. The pilot scampered down the rope ladder and jumped across to the pitching deck of his schooner. The great hull looming above him moved back on course. Her skysails, royals, topgallants, topsails and

## The half-hull model: a designer's three-dimensional sketch pad

*The half-hull model for the clipper Aspasia (above) has alternating layers, or lifts, of pine and mahogany. The lifts could be separated—as in the drawing at right—to calculate the hull's full dimensions. The model is 60½ inches long, with a half-beam of 5¾ inches. The ship, launched in Mystic, Connecticut, in 1856, was 145 feet long, with a 31-foot beam.*

studding sails boomed, and her masts creaked as she took the wind on her quarter and picked up speed. Twin white waves curled away from her sharp bow, and her rounded stern lifted to the following sea as she went boiling off into the open Atlantic, bound down around Cape Horn to the Golden Gate on a voyage that would never be forgotten.

When the *Flying Cloud* put to sea, the record for the California passage was held by the *Surprise,* an A. A. Low & Bro. clipper that had made the run in 96 days, one day faster than the *Sea Witch's* time over the course. But even on a clipper, the length of the voyage made it, in the words of Matthew Fontaine Maury, "the most tedious within the domains of commerce." Moreover, declared Maury in his elegant style, "many are the vicissitudes which attend it." In particular, Maury observed that the storms along the Gulf Stream are more to be dreaded than those encountered anywhere else in the world. Captain Creesy soon had cause to know why.

June 5, as he laconically recorded in the *Flying Cloud's* log, was a day of "Good breezes, fine weather." But the breezes were out of the northwest and, as breezes out of the northwest frequently do on the Atlantic, they increased to strong winds and finally to a gale. The *Flying Cloud's* towering rigging, as tightly tuned as a giant violin, thrummed and keened as the wind picked up speed. The seas built up into ever-larger hills that marched down on the clipper, lifted her stern and rolled along-

No less eminent a marine architect than John Willis Griffiths called it "a proud emblem of American genius." Donald McKay received praise from a shipwright's publication for being among the first shipbuilders to use it. For all its importance, the object in question—a designer's half-hull model *(left)*—was a simple contrivance that looked like an oversized pull-apart toy. Yet in the hands of men like McKay and Griffiths, it literally gave shape to the clipper-ship era.

The half hull—also referred to as a lift model because its sections could be lifted to separate them—was invented in the 18th Century, but came into widespread use in the 1840s and the 1850s. Before then, the shape of a new vessel's hull was worked out either on paper or in a shipbuilder's head, and translated into wooden reality on the ways, according to his eye.

The models functioned somewhat like a three-dimensional sketch pad, allowing a designer to work out the lineaments of his creation in miniature. The scale of the models varied, but the half hull for a clipper 200 feet long was usually about six feet long. The designer began by stacking together slabs of wood of roughly the right size, securing them with dowels or long triangular wedges. Frequently the wood was pine, or pieces of pine alternating with a darker timber to highlight the lines of the hull.

Using gouges, planes and chisels, the designer sculpted one side of the composite block "to suit his fancy," as a shipwright's manual expressed it. The other side needed no shaping, since it was assumed to be a mirror image of the sculpted half. The completed model was taken apart, and the dimensions of each lift were converted to full size for use in the shipyard.

By the 1870s, shipbuilders found that a hand-carved expression of personal experience and esthetics was an insufficient guide for constructing the new and more complex iron steamships, and precise architectural drafts based on mathematical formulas eventually replaced the designer's model.

Oblivion soon claimed the out-of-date half hulls—in part because designers had been secretive about them. Donald McKay's son noted in a letter that, "owing to jealousy, builders never gave a correct model away." After McKay's death, many of his models were discovered in pieces, chopped up for firewood. Only three escaped destruction, along with a few models by other designers. Apart from a handful of original plans, they are almost all that remains to record the designs of the clipper-ship era.

side; their giant combers toppled forward, and the wind batted off their crests, sweeping the deck with salt spray. Two men fought the huge spoked helm to keep the massive hull from swinging about in each surging sea. Suddenly there was a series of explosive snaps as the elastic hemp supporting the top-hamper stretched and gave way. Within seconds the *Flying Cloud's* main-topgallant mast, and its appended royal and skysail masts, canted to one side. Amid a crackling of wood, the shriek of tearing sails and the clatter of falling blocks, the topgallant mast crashed to the deck in a tangle of shrouds, severing the rigging of the upper mizzenmast as it fell. With its support suddenly gone, the mizzen-topgallant snapped away and fell into the wreckage.

While the mate bellowed orders for all hands to tumble up and take their places on deck, Creesy ordered the helmsman to spin the heavy wheel and let the *Flying Cloud* ease off the wind. Topmen scrambled up the rigging and out onto the yards, some of them barely escaping a plunging death as the main-topsail yard, one of the clipper's longest spars, broke loose and was dragged down by the tangle of the rigging.

Even a partial dismasting of a clipper ship in a gale at sea could make a veteran's blood run cold. The ship swayed to the cross seas. The wind whipped the spars back and forth in murderous parabolas. Blocks swung wildly about like wooden wrecking balls. Gale-driven waves smashed over the bulwarks and washed the men off their feet, sweeping them the width or length of the deck. Some of the wreckage from the top-hamper, still attached to its tangled rigging, had been washed overboard. If these spars and sections of mast were not cut loose, they could drive against the ship's sides like battering rams, smashing through her planking and sinking her. Creesy shouted his orders into the mate's ear; the lines snaking over the rails to the wreckage in the water were chopped away and the remaining rigging was secured. The *Flying Cloud* was eased back on course. Under her reduced canvas, she moved a bit more steadily. And Creesy noted in the log: "Lost Main & Mizen Topgallant mast & Main Topsail yard."

The *Flying Cloud* swept on through a howling night. By late morning the gale had abated somewhat, but the clipper had lost much of her speed. The crew, meanwhile, worked feverishly. With diminishing winds swinging from the northwest into the west and southwest, the topgallant masts and their spars were replaced, new rigging was rove, and lifts were taken aloft as the ship limped on her course southward. The next day the *Cloud's* top-hamper was laboriously hauled back into place. In the space of only 48 hours, the crippled clipper had been restored to racing trim, and by June 8 she was sliding through the rolling seas before a gentle breeze. Creesy wrote in his log, "Fine weather. Set all possible sail."

But evidently those three days had been enough to terrify some of the landlubbers in the crew. Many of them, in fact, were not seamen; some had never been to sea before, and most of the crew had shipped aboard only to get to the gold fields. For the next four days, while the *Flying Cloud* gracefully ran down her easting under gentler breezes, some of the foremast hands relived their nightmare and grumbled among themselves about the greater perils that lay ahead. On June 13 it was discov-

*The clipper Flying Cloud takes on cargo in New York shortly before leaving on her maiden voyage to California in June 1851. Though built for fast transport of freight, the vessel was not lacking in amenities for her few passengers. A New York newspaper said it knew of no packet ship or steamer more luxurious.*

ered that the clipper's mainmast was, as Creesy recorded, "badly sprung about a foot from the Hound"—that is, twisted and partially fractured at the junction where the topgallant mast had wrenched away from it. And three days later, when the winds picked up again and blustery squalls swept down on them, the men eyed the bending, creaking main-topmast with undisguised anxiety. The *Flying Cloud's* top-hamper stood up under the buffeting, but the experience only added to the crew's concern.

By June 19 the *Cloud* was entering the doldrums, heralded by intermittent squalls and periods when the sea was as smooth as a millpond, and the ship's progress under sail was frustratingly meager. In the captain's cabin, Mrs. Creesy opened Matthew Maury's book on her chart table and plotted a course through the region. By June 21 her husband was showing his first sign of impatience: His cryptic, unemotional observations in the log gave way to a complaining "Calm Calm Calm." But by the morning of June 23 the log was reporting fresh squalls, and by late

afternoon the *Cloud* was once again experiencing "Gentle breezes" and "fine weather." With Maury's guidance, Mrs. Creesy had brought the ship through this navigational slough in only four days.

Shortly before midnight on June 24, the *Flying Cloud* slipped across the Equator, only 22 days out of New York, and bent her course southward. By June 26 the clipper had made enough easting to round the bulge of Cape São Roque. And now the mood aboard became more ominous. Instead of heading for Rio de Janeiro and repairs for the injured mast, Creesy set course for Cape Horn, where rocky islands curled out eastward from under the continent like a finger beckoning malevolently to oncoming ships. If a mid-Atlantic gale had carried away the ship's top-hamper, might not "Cape Stiff," as the Horn was unlovingly called by seamen, with its murderous gales and blasting snowstorms, strip her as clean as an Indian canoe? So the greener members of the crew must have reasoned. And even the least imaginative foremast hand, after experiencing the partial dismasting three weeks earlier, could visualize the disaster that might occur if the entire mainmast went over the side. But the *Cloud* had begun to pick up the Southern Hemisphere's southeast trade winds, and now nothing short of a mutiny could have persuaded Creesy to put into port.

On July 9 the wind increased to a fresh breeze. That morning, before dawn, a brief thunderstorm flashed across the Atlantic, flattening the waves with its downpour and leaving sparkling whitecaps in its wake. These were weather-breeding conditions and, as the inexperienced crew grew more mistrustful, Creesy braced himself for the storm that finally struck later that day.

It started with another thunderstorm, this one violent. Because Creesy had seen it coming, he had time to order skysails, royals and topgallants furled and the topsails double-reefed, cutting down their exposed surface area by about a third. The storm kept up all that night, and morning brought even stronger winds. In his log Creesy noted "blowing hard Gale—No Observations." He ordered the topsails shortened to their last rows of reef points. All the clipper carried now were close-reefed topsails and staysails—fore-and-aft triangles of canvas rigged between the masts and intended to help steady the ship as she ran before the storm. But even these were strained mightily by the wind, and suddenly, with a great ripping sound, two of her staysails split into tatters. Rushing and sliding about the water-washed decks, the men lowered and gathered in the remnants and stowed them below. While they were working they could hear a groaning, cracking noise: The weakened masthead was threatening to give way.

Creesy looked off to leeward and saw that the *Cloud* had company. Not far away a brig was laboring desperately. As he watched, her fore- and main-topmasts canted over, split away and tumbled into the sea. With his own mainmast bending and creaking, Creesy was too busy to go to her aid. He ordered his upper yards lowered in an attempt to ease the strain on the mast. The clipper was dipping the tips of her yardarms into the sea as she rolled to leeward. Water rushed over the lee rail and swept waist-high across the deck, knocking men off their feet and sending them thumping against the deck housing. But one by one the spars were

# Enchanting relics of a lost nautical art

Although they are remembered chiefly as a streamlined embodiment of sheer speed, clippers were also the last great seafaring home of a major decorative art: the craftwork of the ship carver.

Ship carving dates back to the beginnings of maritime history. Small carvings—often a stylized eye believed to possess supernatural powers of guidance—appeared on the bows of Egyptian ships even before 1000 B.C. More elaborate figureheads, usually swans or horses, later adorned Phoenician and Roman vessels. But the zenith of this art form was achieved on the magnificent wooden sailing ships of the 19th Century.

The master ship carvers of the day practiced their work on a variety of shipboard subjects, including figureheads, nameboards, billetheads, transoms and binnacles *(right)*. On clipper ships—in keeping with pioneer designer John W. Griffiths' conviction that "the head of a ship stamps an impression on the mind in relation to the entire ship"—figureheads such as the ones on the following pages provided the bulk of the carvers' commissions.

Most figureheads straightforwardly reflected the names of the clippers they graced—a simple matter in cases like *Carrier Pigeon*, *Game Cock* and *Stag Hound*. But at times a carver was hard-pressed to suitably represent the name of a ship. The *Charmer* sported what one observer—making an unkind reference to a Boston reservoir—described as "a snake with the tongue hanging out as if it had a drink of Cochituate water and did not like it."

Clearly, the best of the ship carvers' creations were their human figures. Most often the figures were female—appreciatively characterized by Joseph Conrad as "women with mural crowns, women with flowing robes, stretching out rounded arms as if to point the way."

For the ship carvers themselves, the road ahead was anything but promising. As the construction of wooden vessels declined, more and more carvers closed their doors and put away their shop-front notices such as the one below. By 1896, when this sign was removed from the entranceway of the Boston firm of Hastings & Gleason, an ancient craft had all but disappeared from the seafarers' world.

*Carved in 1839, this sign served five Boston firms in succession during the next 57 years.*

*This binnacle boy—with an injunction to "mind your helm" inscribed on his hat—carried the clipper N. B. Palmer's compass inside its brass binnacle. So lifelike was the figure that strange tales about its power circulated on the Palmer. Helmsmen insisted that it was haunted and that the boy's eyes followed them. Their fear eventually led to the removal of the figure from the ship.*

*Because it could be damaged by storms at sea, the figurehead for the Davy Crockett was mounted in port only.*

*One historian called this classical figurehead for the clipper Glory of the Sea "the swan song of the craft."*

*The figurehead carved for the Great Republic was removed after a fire almost destroyed the clipper in 1853.*

*Carrying a claymore, a Scottish sword, this Highlander graced the clipper Donald McKay, named for her designer.*

*A rendering of Galatea, a star-crossed sea nymph in Greek mythology, adorned the bow of the ship of that name.*

brought down, first the royal and then the topgallant yards. The mainmast seemed firmer without their weight. But the gale continued to increase, in periodic, thundering gusts.

It continued through another night. In such weather the clipper's sharp bow no longer sliced through the waves. The seas had grown so large that the *Cloud* would race downhill as one wave rose astern, then rise as the moving mountain went under her. Atop the peak of the giant wave, her masts would shudder and her thin row of reefed sail would slat violently. Then down again, so deep in the trough that her sails would go limp. All night long the clipper lurched and heaved as the phosphorescent surf exploded all around her.

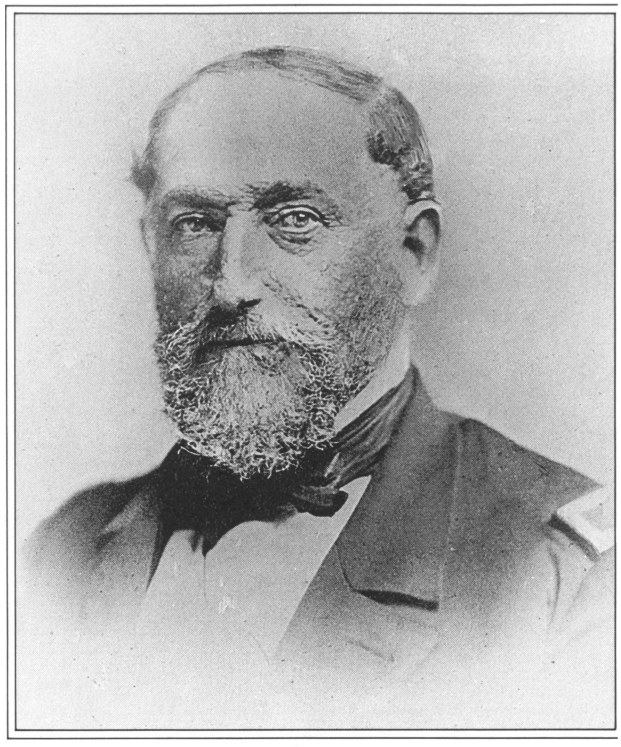
The storm raged on through the morning of the next day, and early that afternoon Creesy was told that his ship was leaking. The forecastle, positioned atop the main deck on the *Flying Cloud*, was already awash with much more water than could have come in from the deck, and it was getting ahead of the pumps. Bellowing to each other on the afterdeck, Creesy and the ship's carpenter analyzed the situation. The carpenter thought that the stopper in the anchor hawsehole to port had been forced out and that the water could be entering there. Creesy barked at the helmsman. The *Flying Cloud* eased off the wind slightly and righted a bit while the carpenter went to inspect the hawsehole. A few moments later he came racing aft to report that the *Cloud* had been sabotaged.

The hawsehole stopper had indeed come loose. But after repairing it, the carpenter saw that the water, instead of draining overboard through the scuppers, was pouring into the 'tween decks through a hole beneath an after bunk. As he tried to stopper it, he discovered that someone had made it by drilling two auger holes through the ship's deck and using a marlinespike to join the two into a single opening four inches across. The sea poured through it into the under decks and hold, soaking some of the cargo and threatening to swamp the ship.

Creesy put the clipper back on course. As the storm tore at her scant sails and the crew heaved at the pumps, the carpenter and his helpers worked to plug the leak. Creesy meanwhile ordered the mate to find the culprit. It did not take long; the man had been foolish enough to drill the holes under his own bunk, hoping, no doubt, to force the *Cloud* into port. And another crew member reported seeing him emerging from the forecastle with an auger in his hand. It was also discovered that the saboteur had had an accomplice. Both men were seized and put into irons.

Meanwhile, the carpenter's ministrations proved successful: The forecastle was soon pumped out and the *Flying Cloud* continued her plunging course southward. By the time the gale finally moderated the next day, the clipper's deck was a mass of splintered railings and gear. There was so much repair work and cleanup to be done that Creesy had the irons taken off the two saboteurs long enough for them to help.

On July 19, dainty storm petrels and great wheeling albatrosses appeared in the sky overhead, indicating that the *Flying Cloud* was approaching Cape Horn. That afternoon the wind gradually veered into the northeast and picked up strength once again. Creesy had to order the studding sails taken in before their booms dipped into the water and were carried away.



*Fiery New Englander Josiah P. Creesy was chosen to be the Flying Cloud's first commander in 1851 on the basis of his reputation for getting peak performance from his ships and crews. In four years at the helm, Creesy more than justified his selection: He made five runs from New York to California in an average time of just over 100 days, and twice made the voyage in a breakneck 89 days, a record that was never surpassed under sail.*

*Josiah Creesy used this 17-inch-long brass speaking trumpet to shout orders to crewmen high in the rigging or to hail nearby vessels amid stormy seas. The instrument is inscribed with the captain's name just above its flared bell.*

The next morning Mrs. Creesy, her arms hugging the sides of her swaying chart table, told her husband that they had better alter course. By her calculations, the point of Cape San Diego lay dead ahead, and the weather was too thick to sight the land in time to wear off. The rain that had come on with the northerly wind had turned to sleet and was rapidly developing into a blizzard. Creesy sent the *Cloud* northward, away from the rocky cape, and called for furled courses; however, he left the topsails up, close-reefed so that, as the ship sank into the valleys between the huge waves, these upper sails would hold the wind and keep the ship under way and maneuverable.

The *Cloud* was fairly in Cape Horn weather now. The snowstorm continued throughout the 20th as the ship zigzagged back to the south. The wind drove the snow across the deck in nearly horizontal sheets, piling drifts on the leeward sides of the deckhouses. The next day the temperature moderated a bit and the snow turned to rain. But, as Creesy noted, there was a "bad sea Running" and the *Cloud* was shipping water across her deck. Then, on July 22, the skies cleared. Ten miles off her starboard bow stood Cape San Diego, a black band of granite over the slate-gray sea. Mrs. Creesy's dead-reckoning navigation was exactly on target.

In moderated winds, the *Flying Cloud* ran through the Strait of Le Maire, between Cape San Diego and Staten Island, with all sails set. By 6 p.m. she was safely through and in open water, with the land out of sight. A strong tide was setting northward, and Creesy posted a lookout in the bow to keep watch for ship-crushing formations of drifting ice. Next morning the wind was light; Creesy ordered all sails set again. And at 8 a.m. there it was: Cape Horn, only five miles north of them.

The snow-covered, 1,391-foot headland fell away to a white-blanketed shore. Swirling clouds of ducks swept in moving patterns over the bleak promontory, swinging down and splash-landing near the rocks. As the sailors watched, another snow squall raced toward them. Cape Horn disappeared behind a white curtain, and the *Cloud* raced on westward toward the Pacific. Mrs. Creesy, with the aid of Maury's charts, had navigated the clipper so well that she had not gone much farther south than 56°, well north of the course that most ships took around the Horn. By noon of July 26 the *Cloud* was at lat. 50.57°, romping up the western coast of South America in a fine breeze under clear skies. Her transit of the Horn had been remarkably swift. Many ships spent weeks and sometimes even months making good the same distance that she had covered in just three days.

Before facing the Horn, Creesy had lowered the topgallant and royal yards to relieve the weakened mainmast; now, with the weather improved, he sent them up again. For four days the winds continued moderate, with only an occasional light rain squall, and by July 30 the *Cloud* was more than 1,000 miles up the coast at 41° 58′ S., with all studding sails drawing and a fresh southeasterly on her starboard quarter. But late that afternoon the wind became squally. Creesy brought in some of the studding sails. The wind soon piped up to storm strength, and by 2 a.m. of July 31 the *Cloud* was staggering under a series of sharp squalls. At dawn everyone was eying the weakened mainmast again.

Creesy decided to chance leaving the topgallants set this time to see

*Carrying only her topsails and a small jib in a violent gale, the Flying Cloud scuds past Cape Horn in this oil by 19th Century marine painter J. E. Buttersworth. The topsails—low enough for easy reefing but still high enough to catch the wind when the ship was in the trough of a wave—enabled the vessel to hold her course in a storm without overtaxing the masts and rigging.*

what she could do. He stood spread-legged on his slanting quarter-deck and watched his fine ship leap ahead before each smashing squall. A mate and his crew, hanging onto the lee rail, logged the *Cloud's* speed. One man tossed a weighted piece of wood called a drogue over the side; another watched a sandglass as the line attached to the drogue flew off its drum. The line was marked at intervals to measure the amount yanked out after the drogue. Creesy and his men were dumfounded to see the line play itself out entirely before all the sand had passed through the glass. This meant that the *Flying Cloud* was traveling at a speed somewhere in excess of 18 knots. At first they could not believe it, but when Mrs. Creesy calculated their noon-to-noon run from her sextant observations she found that the *Flying Cloud* had run 374 nautical miles, an average speed of about 15½ knots. No sailing ship had ever before attained this speed. Other clippers would soon go still faster, but almost a quarter of a century would pass before any steamship could match the pace of the *Flying Cloud*.

Streaking for the Golden Gate, her gilt-and-white angel clipping through the wave tops like a dolphin, the *Cloud* raced on through more squalls. Finally, to spare his groaning mainmast, Creesy ordered the topgallants taken in, and double-reefed the fore- and mizzen-topsails.

The clipper scarcely slowed, making 334 miles on the next day's run.

On August 12 the *Flying Cloud* raced past the Equator and into north latitudes. The northeast trades took over, fresh and full. Creesy kept everything flying; he knew by now that he stood a chance of breaking the *Surprise's* record of 96 days. For the next 12 days he was blessed with favorable winds and relatively clear weather, and the *Cloud* devoured her route with runs averaging better than 200 miles a day. On August 24 the wind dropped, and the next two days brought an agonizing succession of "Light Baffling" breezes, as Creesy described them. Then the fresh winds returned, followed on August 29 by squalls. Racing for a record, Creesy kept his lofty sails flying—and lost his fore-topgallant mast.

But he refused to give up now. And most of his previously disaffected crew had also caught the fever. With superhuman effort, despite more shrieking squalls, they got the topgallant mast back in place in only 24 hours. Then, on August 31, Creesy recorded: "At 6 AM made South Farallone." The Farallon Islands mark the entrance to San Francisco harbor. Running for the finish line with a squally northwester on her weather bow and with everything flying except Perk Creesy's nightshirt, the *Flying Cloud* swooped down on the Golden Gate. She pulled up briefly before entering San Francisco Bay, and a pilot came aboard to guide her to her dock.

Most of Captain Creesy's crew immediately deserted and swarmed through the city's saloons on their way to the gold fields. As a result, within hours everyone in San Francisco had heard the news: Donald McKay's amazing new clipper had made the passage from New York to the Golden Gate in 89 days 21 hours, bettering the time of the *Surprise* by nearly a week.

After selling his cargo of cheese, butter and other goods prized in that brash but remote metropolis, Creesy put to sea again, racing on around the world, across the Pacific to Canton, then around the Cape of Good Hope and on to New York with a fresh crop of tea. There, Creesy and the *Cloud* received a riotous welcome. Newspapers called the voyage a national triumph. "The log of the *Flying Cloud* is now before us," wrote one editor. "It is the most wonderful record that pen ever indited, for rapid as was the passage, it was performed under circumstances by no means the most favorable."

The *Flying Cloud* had paid for herself on this one round-the-world voyage, and the grateful Messrs. Grinnell and Minturn had her log printed in gold letters on white silk, making a number of copies to distribute to friends of the firm in the hope that they would remember the feat the next time the *Flying Cloud* loaded for California.

In the years that followed the *Flying Cloud's* legendary run to San Francisco, more and more clipper ships came down the runways of shipyards from Maine to Virginia and struck off around the Horn with lucrative cargoes for the California market. In many cases, they sailed on from San Francisco to China, where they took on cargoes of tea—often destined not for the Americans but for the tea-thirsty British.

Only a few years earlier, that trade would have been closed to Ameri-

*While a pilot schooner bobs in the foreground, the Flying Cloud (far left) and the steamer John L. Stephens converge on San Francisco Bay in this 1855 lithograph. Both clipper ships and paddle-wheelers prospered on the run to California.*

*Steamship lines charged passengers $600 first-class and $300 steerage for a five-week trip from New York via Panama; clippers, whose chief business was freight, usually took about four months by way of Cape Horn and charged passengers a flat $300.*

can ships by the British Navigation Acts, laws that since the time of Oliver Cromwell had, in effect, assured a monopoly for British ships in trade between the British Isles and the Orient. The British East India Company, a gigantic quasi-governmental trading institution, had grown fat and rich as its vessels made their ponderous way out to Asian ports of call and back to London. Until the early 1800s, they often had taken a year or a year and a half each way. On such voyages two to three knots was the average rate of speed, all light sails were taken in at sundown, and if there was the merest suggestion of bad weather the ship hove to for the night. During the first half of the 19th Century, competition with other British ships caused the stately East Indiamen to speed up their runs to the Orient, but they still lagged considerably behind the swifter vessels from the United States.

Fortunately for the British merchant marine, Parliament foresaw that eventual economic isolation would be the consequence of the Navigation Acts. In 1849 Parliament repealed them, in the hope that British merchants would be stimulated to construct faster vessels that could compete with the trading vessels of other nations—particularly the speedy American clippers.

Parliament did not have to wait long for its plan to work. In August 1850 an American clipper arrived in Hong Kong to take on tea for London. The ship was the *Oriental*, under the command of Nat Palmer's brother Ted, and she was one of the fastest vessels in the American merchant fleet at that time. On her voyage out to Hong Kong from New York she had broken the record for the route, running it in 81 days. With this stunning accomplishment to recommend her, British shippers in Hong Kong competed for space in her holds. The East Indiamen had been loading tea at freight rates of 3 pounds 10 shillings per 50 cubic feet. Palmer took on a cargo of fresh tea at the unheard-of rate of six pounds per 40 cubic feet. Crammed to her bulkheads with 1,600 tons of the precious crop, the *Oriental* raised anchor and slid out of Hong Kong harbor on August 28, 1850. In 97 days she was in London.

The arrival of the *Oriental* caused a sensation in Victorian London. Crowds flocked to the West India Dock to inspect this tall newcomer. They commented on her sharp bow and her long, slim hull, and pointed to her soaring skysail yards. The British had built some ships larger than the *Oriental*, but none with such towering masts, which seemed to rise like redwoods in a forest of oak. The *Oriental* lorded it over every ship in the harbor, many of whose boats drifted alongside her, oars dripping while the mariners in them shook their heads in disbelief. Palmer saw to it that every sail was furled tight as a drumhead, every bit of brightwork polished, every line coiled in place.

London's countinghouses buzzed with envious comment and dire predictions. Now that England's merchant fleet was no longer protected by the Navigation Acts, the United States of America, only 74 years old, bade fair to dominate her parent country's tea trade just as surely as this big clipper dominated the British ships in the Thames. "The Thunderer," as *The Times* of London was known, thundered: "We must run a race with our gigantic and unshackled rival. We must set our long-practised skill, our steady industry, and our dogged determination,

*The Oriental, first U.S. clipper to carry tea from China to England after the repeal of British statutes that restricted the trade to British vessels, approaches the West India Dock in London on December 3, 1850. The Oriental's arrival, wrote a chronicler of the clipper era, "aroused almost as much apprehension and excitement in Great Britain as was created by the memorable Tea Party held in Boston harbor in 1773."*

against his youth, ingenuity, and ardor. It is a father who runs a race with his son. A fell necessity constrains us and we must not be beat. Let our ship-builders and employers take warning in time."

They did. Before the *Oriental* dropped down the Thames to return to China, the Admiralty requested permission to take off her lines, and she was towed to the dry dock at Blackwall to provide example and inspiration for local shipbuilders. In short order, the British had begun to produce vessels that could challenge the American monopoly on speed under sail. Their clippers were smaller than the Yankee ships designed to sail around Cape Horn, but they were well suited to the China run in that they had a narrower beam that made them faster and more weatherly in the light breezes of the Indian Ocean.

Thus, within two years of the *Sea Witch's* startling Hong Kong-to-New York run of 1849, the clipper had become established as the most desirable ship for long-haul voyages to any corner of the globe. Shipyards in Britain and the United States were building clippers as fast as they could, and merchants everywhere gladly paid the clippers' higher freight rates. The shippers were buying speed and, as more and more clippers competed for their business, clipper captains drove their ships and their crews to the limit to see that the customer got what he was paying for.

# From mold loft to launch: genesis of a Yankee clipper

Building a clipper involved a measure of intuition, since no two clipper hulls were exactly alike: Each was a fresh attempt to create the perfect sailing ship. The designer first sculpted a model of the hull *(below and pages 56-57)*, whose curves could be enlarged and outlined in the mold loft *(right)* to produce templates for shaping the timbers.

If the clipper had been commissioned from a small shipyard like the one pictured on these pages, the various woods—rock maple and white oak from Massachusetts, cedar and pine from Maine, live oak from the South—were often cut specifically for that ship (big yards usually stockpiled timber so that construction could begin as soon as orders were received). The trees were felled during the winter months, when most of their rot-inducing sap had fallen into the roots and lower trunk. In the spring, to hurry the seasoning, the timbers were stripped of bark, steeped in hot water to remove the remaining sap and dried in the sun.

Over the following months, teams of craftsmen—carpenters, dubbers, joiners, calkers and fasteners—worked together to translate the designer's vision into reality. Timbers were sculpted into structural elements and adzed smooth. Thousands of wooden fasteners called treenails (but pronounced "trunnels") were split by hand to within a fraction of the standard inch-and-a-quarter diameter. And planks were steamed in ovens until they were pliable enough to be bent into the requisite hull contours. Gradually the new clipper rose on its bed of keelblocks by the river's edge, where, less than a year after the order for the ship was placed, it finally reached completion.

*With a mallet and a gouge, a designer shapes his model (below) before taking it to the mold loft (right). There, the model's contours—enlarged to full size—are traced on the floor with chalk; flexible battens, temporarily pinned to the floor, guide the tracing and ensure smooth curves. The chalk lines, in turn, are guides for making wooden templates, which will be used as patterns for the ship's ribs.*